World Petroleum

FIVE DOLLARS PER YEAR • ONE DOLLAR PER COPY
DECEMBER, 1951

Ask Your Lane-Wells Man

about the "SLYDEZE" SLIP

a great, NEW IMPROVEMENT in PACKERS

To be absolutely accurate, you *can* see it — but only if you want to take a Lane-Wells packer apart. For this new improvement is on the *back* of the slips. It's a new treatment which practically eliminates the slips' sticking, even under high temperatures and heavy pressures.

Because slip-cone friction may be a major cause of stuck packers, Lane-Wells began investigations and tests, two years ago, to find some method of insuring free slip movement under all conditions of packer service. And now it's here! After many tests of many methods, a way was found to apply a coating to all contact surfaces of Lane-Wells famous dovetail slips, to give a permanently lubricated surface that slides easily under all service conditions.

Extensive field tests have demonstrated that Lane-Wells packers with these new treated slips release easily, even after having been set under extreme pressures.

Tomorrow's Tools – Today!

AP-405

Los Angeles • Houston • Oklahoma City • Lane-Wells Canadian Co. in Canada • Petro-Tech Service Co. in Venezuela
General Offices, Export Office and Plant • 5610 So. Soto St. • Los Angeles 58, California

Unique

"Newallastic" bolts and studs have qualities which are absolutely unique. They have been tested by every known device, and have been proved to be stronger and more resistant to fatigue than bolts or studs made by the usual method.

C. P. Newall & Co., Ltd.

POSSILPARK GLASGOW · N

pipe line upkeep *costs more* now!

No. 1660X Class 600
Pipe-Line Gate Valve

You spend less for upkeep by using Dependable Quality

CRANE VALVES

...That's why More Crane Valves are used than any other make!

smooth, full flow through this new pipe-line valve

Conduit-type, double-seating disc in this new Crane valve has circular openings that coincide with seat openings. Flow resistance is reduced to a minimum. There are no pockets to accumulate dirt or contaminating fluids. Turbulence and erosion of seating surfaces are avoided.

Easy operation, long life, and reduced maintenance are assured by provision for thorough lubrication of all working parts. Body and bonnet are packed with grease which is retained by patented spring-loaded plates. Stem is inclosed in grease filled yoke with lubrication fitting.

Ask your Crane representative about these new valves for crude, finished product, and gas lines.

CRANE CO.

General Offices:
Crane Co.,
836 S. Michigan Ave.,
Chicago 5, Illinois, U.S.A.

In Canada:
Crane Limited,
1170 Beaver Hall Square,
Montreal, Quebec

In Great Britain:
Crane Ltd.,
45-51 Leman St.,
London E. 1, England

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

WORLD PETROLEUM for December, 1951, Vol. 22, No. 13, December, 1951. WORLD PETROLEUM is published monthly by Mona Palmer, Trustee under the will of Russell Palmer, 2 West 45th St., New York 36, N. Y. Acceptance at East Stroudsburg, Pa., under Section 34.64 P. L. & R. Authorized. Subscription rate: $5.00 per year, single copies $1.00. Copyright, 1951 by Mona Palmer, Trustee.

ANTIKNOCK COMPOUND

The improvement in gasoline made by the addition of antiknock fluid adds about sixteen cents to the value of today's gasoline dollar

Gasoline is sold by the gallon, but it is used by the mile. And on the basis of mileage, modern gasoline improved with antiknock fluid is a tremendous bargain.

Today's cars, with few exceptions, are heavier, more powerful and faster than their counterparts of twenty-five years ago. Yet, despite increases in weight and power, many modern cars actually deliver more miles per gallon. To put it another way, they give greatly improved "ton-mile" economy.

How antiknock fluid steps up mileage

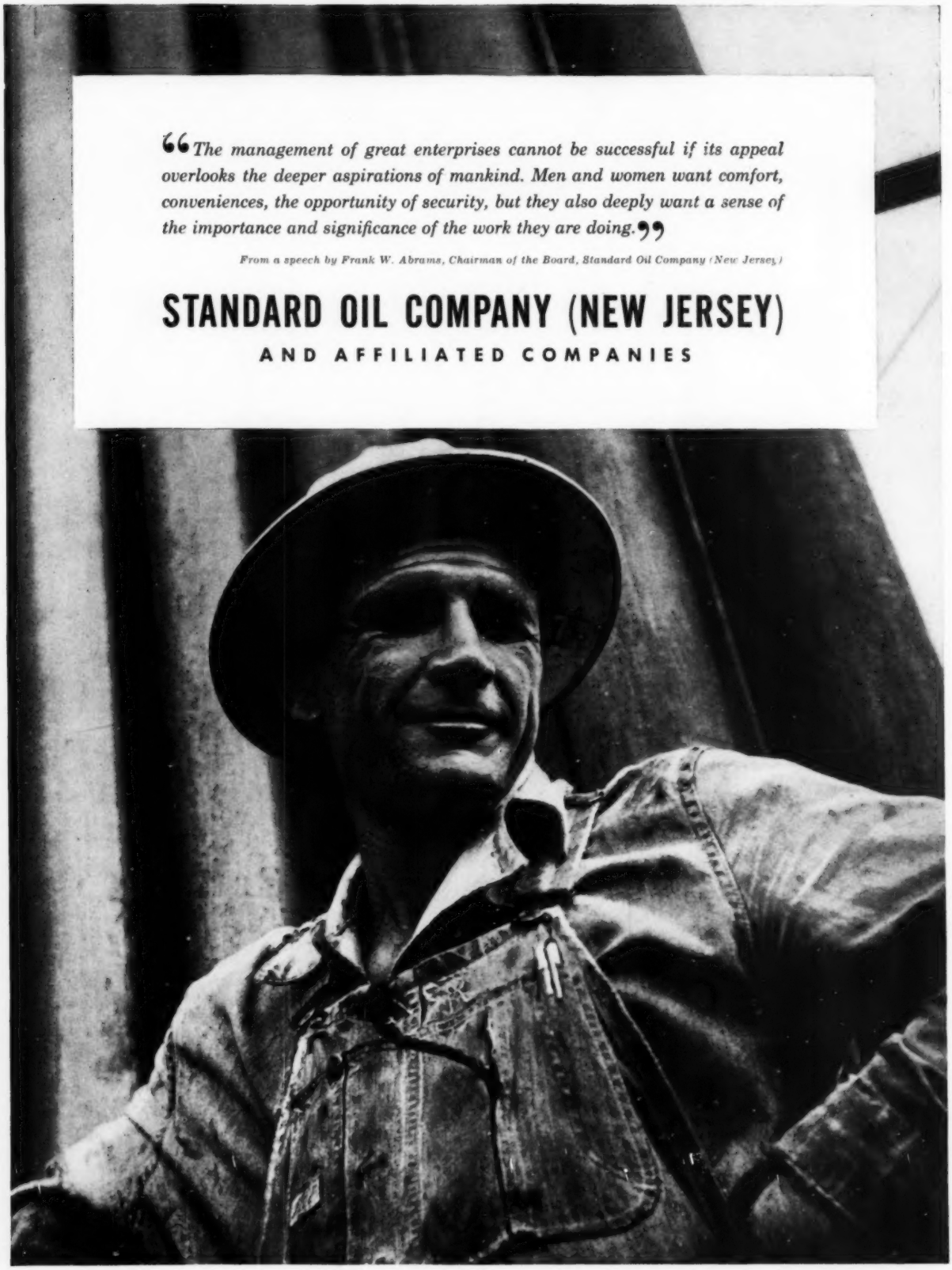
One of the principal reasons for this improved economy is today's high octane number gasoline, which permits higher engine compression ratios and correspondingly higher engine efficiencies. The petroleum industry has made possible this greatly improved gasoline by developing advanced refining methods and through the addition of antiknock fluid.

The use of antiknock fluid has added an average of ten octane numbers to the gasoline normally found in service stations. If this antiknock fluid were not available, then automobile engines of the latest design would have to have their compression reduced about one ratio. Under these conditions the only way to restore acceleration and hill-climbing ability to present levels would be through a change in rear-axle ratio to increase engine speed. The end result of this change would be a loss of about 2.6 miles per gallon in cars which now average around 16 miles to the gallon—or a loss of about 16%.

Translated into dollars and cents, the improvement in gasoline antiknock quality contributed by antiknock fluid adds about 16¢ to the value of your gasoline dollar.

ETHYL CORPORATION, New York 17, N. Y.

Makers of "ETHYL" antiknock compound



"The management of great enterprises cannot be successful if its appeal overlooks the deeper aspirations of mankind. Men and women want comfort, conveniences, the opportunity of security, but they also deeply want a sense of the importance and significance of the work they are doing."

From a speech by Frank W. Abrams, Chairman of the Board, Standard Oil Company (New Jersey)

STANDARD OIL COMPANY (NEW JERSEY)

AND AFFILIATED COMPANIES

From one pipe to another...

from "The Pipe Book" by Alfred Dunhill

FRENCH COMMEMORATIVE PIPE

French pipe makers excel in pipes of graceful design and execution, subjects of topical interest often being chosen. The illustration shows a fine example, a portrait of a Crimean veteran.

INDUSTRIAL PIPING AND ITS HEAT INSULATION

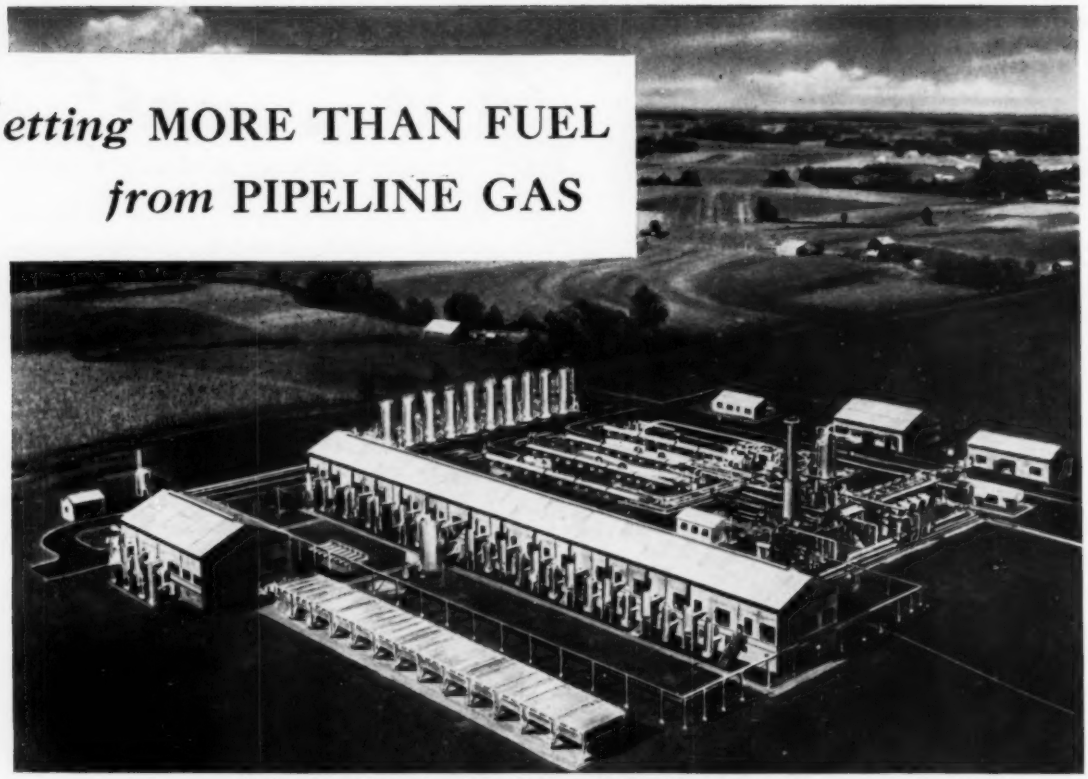
The industrial pipe does not lend itself to such ornate design; efficiency is more important. KENYON will survey your plant and put forward schemes of heat insulation representing the best balance between capital expenditure and the year-by-year saving which proper insulation ensures. Installations carried out in any part of the world.

WILLIAM KENYON & SONS (AMERICA) LTD
136 LIBERTY STREET, NEW YORK, 6, N.Y.
WILLIAM KENYON & SONS LTD., DUKINFIELD, CHESHIRE, ENGLAND

KENYON *Planned* HEAT INSULATION

KH85

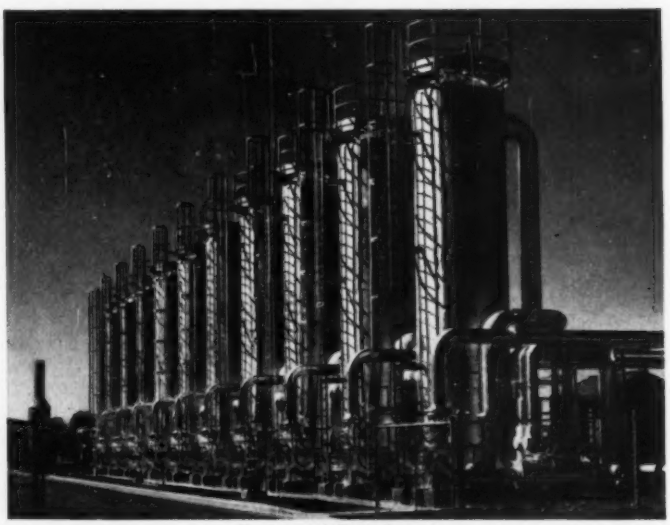
Getting MORE THAN FUEL *from* PIPELINE GAS



Hydrocarbon Extraction Plant, Tennessee Gas Transmission Company

This plant of the Tennessee Gas Transmission Company at Gabe, Kentucky, is the first of its kind to be constructed adjacent to a major natural gas transmission line, for the further extraction of bottled gas and aviation and motor gasoline components from "dry" pipe line gas.

Stone & Webster Engineering Corporation made a report and appraisal of the economics, feasibility and best location for the project and was employed for the design and construction of the plant.



Battery of Dehydrators

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.

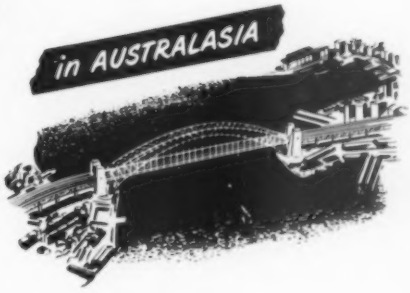
TRUSTED

SYMBOL

HALFWAY 'ROUND THE WORLD

CALTEX

REG. T. M.



...for quality fuels and lubricants

...for transportation and industry

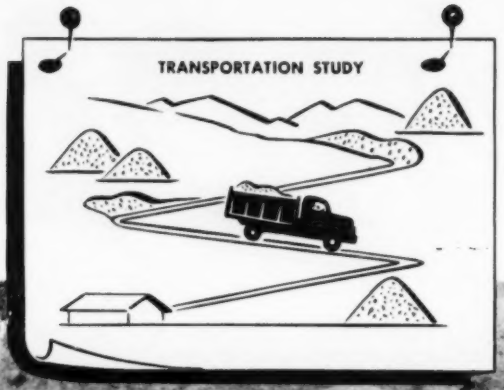
In the eastern hemisphere the Caltex star is a familiar and trusted trademark. It is an important ally of sound management – on land and at sea.

Caltex represents convenient, reliable sources of supply that assure on-schedule operations. More than that–Caltex represents efficient, increased production through the use of Caltex fuels and lubricants. Still more – Caltex is an accepted and used technical service. Skilled lubrication engineers are available – seeing to it that Caltex products deliver their greater efficiencies and economies.

CALTEX

PETROLEUM PRODUCTS

SERVING EUROPE...AFRICA...ASIA...AUSTRALASIA



Putting ideas into action

Three International Truck series – the L-160, L-170 and L-180 models – are rapidly becoming "performance leaders" where trucks from 14,000 to 21,000 pounds gross vehicle weight are used. Why? More satisfying operation for a greater cross-section of truck owners!

INTERNATIONAL means "Stamina on the Job"

Because they're Heavy-Duty Engineered to master these tough hauls, International Trucks just can't be beat for stamina on the job! Remember, Heavy-Duty Engineering is found in *every* part of an International, to give you longer truck life and keep operating and maintenance costs down.

What's more, better mileage goes hand in hand with more power in these great International Trucks. That's because all-truck engines are used in every model . . . engines that incorporate the latest advances in design to guarantee a more efficient combination of power, speed and economy.

Find out more about these popular trucks from your International Truck distributor. He has full facts on the International model that will stabilize your transport costs. International Harvester Export Company, 180 No. Michigan Avenue, Chicago 1, U.S.A.

Diesel engines available in L-170 series and larger.

INTERNATIONAL

INTERNATIONAL TRUCKS

Better Living through Better Roads

SERVICE LEDGER
1901-1951

ANGLO-IRANIAN OIL CO. LTD.
ARGENTINE GOVERNMENT OIL FIELDS
ARGENTINE MINISTRY OF WAR
ATLANTIC REFINING CO.
ATOMIC ENERGY COMMISSION
BRITISH AMERICAN OIL CO. LTD.
CANADIAN OIL REFINERIES, LTD.
CALIFORNIA REFINING CO.
CHAMPLIN REFINING CO.
CIE. DE RAFFINAGE SHELL-BERRE
CIE. FRANCAISE DE RAFFINAGE
CIE. INDUSTRIELLE DES PETROLES
CITIES SERVICE OIL CO.
CITIES SERVICE REFINING CORP.
COLGATE-PALMOLIVE-PEET
CONSOLIDATED REFINERIES, LTD.
CONTINENTAL OIL CO.
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GENERAL PETROLEUM CORP. OF CALIFORNIA
GLOBE OIL & REFINING CO.
GULF OIL CORP.
HUMBLE OIL & REFINING CO.
IMPERIAL CHEMICAL INDUSTRIES
IMPERIAL OIL LTD.
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LION OIL CO.
MAGNOLIA PETROLEUM CO.
MARINE OIL REFINERS OF AFRICA, LTD.
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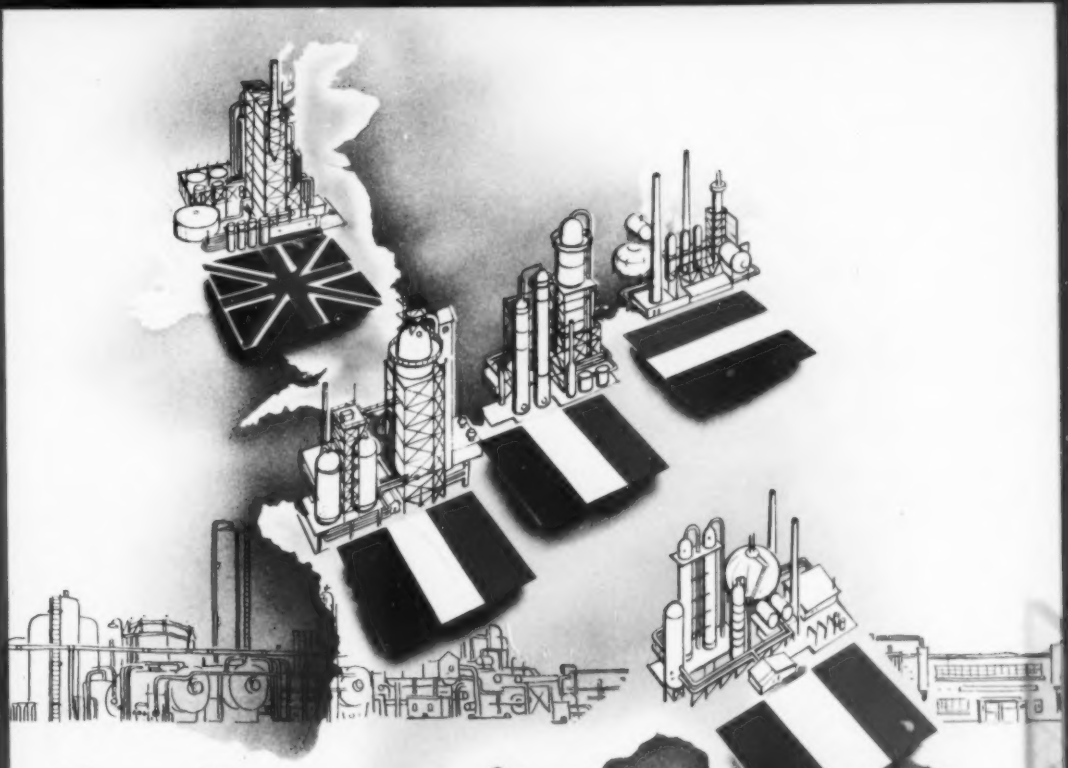
McCOLL-FRONTENAC OIL CO., LTD.
MID-CONTINENT PETROLEUM CORP.
MITSUBISHI OIL CO., LTD.
NATIONAL PETROLEUM COUNCIL OF BRAZIL
PAN AMERICAN REFINING CORP.
PENNZOIL CO.
PHILLIPS PETROLEUM CO.
POLYMER CORP., LTD.
PURE OIL CO.
SHELL CHEMICAL CORP.
SHELL OIL CO.
SHERWIN-WILLIAMS CO.
SINCLAIR REFINING CO.
SKELLY OIL CO.
SOCIETE DES RAFFINERIES DE PETROLE DE LA GIRONDE
SOCIETE GENERALE DES HUILES DE PETROLE
SOCIETE INDUSTRIELLE BELGE DES PETROLES
SOCONY-VACUUM FRANCAISE
SOCONY-VACUUM OIL CO.
E. R. SQUIBB & SONS
STANDARD OIL CO. (INDIANA)
STANDARD OIL CO. (OHIO)
STANDARD OIL CO. OF CALIFORNIA
SWIFT AND CO.
TEXAS CO.
UNION OIL CO. OF CALIFORNIA
UTAH OIL REFINING CO.
WASATCH OIL CO.
WOOD RIVER OIL & REFINING CO.



From Kerosine to Petro-Chemicals

...on the European Continent!

Kellogg engineers have been working with international refiners since the days when kerosine accounted for a third of the liquid product sales . . . and pot stills were standard equipment. Subsequently, much of Europe's thermal cracking and other refining facilities were supplied by Kellogg.

Through the years, Kellogg has built complete refineries and refining units for the Continental affiliates of such international companies as Esso, Shell and Anglo-Iranian, as well as for the major national refiners of Belgium, France and Italy.

Currently, several major Kellogg-designed plants are under construction . . . at Antwerp, Belgium; at Dunkirk and Gonfreville, France; at Ferrara, Italy. These projects encompass one complete refinery and many individual process units. Refining processes being utilized include atmospheric distillation, visbreaking, thermal cracking and reforming, propane deasphalting, Furfural treating, and Fluid catalytic cracking for the British Isles. Allied, though not an actual refining project, is Italy's first plant to produce olefins and their petro-chemical derivatives. This latter is Europe's second such plant, the first one having been designed by Kellogg for Imperial Chemical Industries in England.

THE M. W. KELLOGG COMPANY

A SUBSIDIARY OF PULLMAN INCORPORATED

for fifty years an integral part of processing history

NEW YORK JERSEY CITY LOS ANGELES TULSA HOUSTON TORONTO LONDON

Portrait at

This year is Kellogg's fiftieth of service to industry. At this time naturally, as a group of men—known collectively to the modern business world as The M. W. Kellogg Company—we can think back nostalgically. We can remember the chimney stacks

"In the Final Analysis..."

In previous issues of this magazine, "camera portraits" of M. W. Kellogg today have highlighted major aspects of Kellogg's operations, from basic research through the many steps to job-site construction.

This month, the camera takes a parting look at the construction lot and then focusses, through other company activities, on the over-all picture of Kellogg's service to industry.

1. *KELLOGG'S CONSTRUCTION FORCE* is permanently staffed, right down to key craft foremen. This proves particularly advantageous in the specialized installation of high-pressure, high-temperature utility power piping. Accurate pre- and post-heat as well as welding procedures must be followed to insure perfect fabrication of the alloys now being used for this type of service.

4. THE "PAY-OFF" in Kellogg's business is revealed by two ostensibly unrelated activities—accounting and initial operation of equipment or plants. Both contribute to the final evaluation of a job: *How well did it work out cost-wise? How well does it perform the job for which it was designed?* From this office Accounting Control is exercised over all Kellogg projects. Spotlighting true costs of even minor activities, this department illuminates the path to lower costs and keeps field supervisors continually cost conscious.

OPERATING INSTRUCTIONS For GAS RECOVERY & GASOLINE FRACTIONATION UNIT
OPERATING DEPARTMENT THE M.W. KELLOGG COMPANY
OPERATING INSTRUCTIONS For 15,500 B.P.S.D. FLUID CATALYST CRACKING UNIT
OPERATING DEPARTMENT THE M.W. KELLOGG

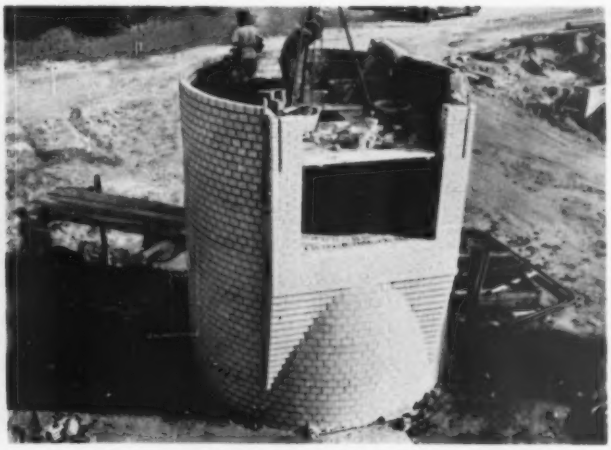
5. *"OPERATING INSTRUCTIONS"* are delivered to customers with completed Kellogg process units. The *practical* operating men who "build" these books start on the task with the inception of each project in the Design Engineering Department. In this way, they make certain that all features required by the customer for efficient operation are incorporated in the final design.

Fifty... no. 11

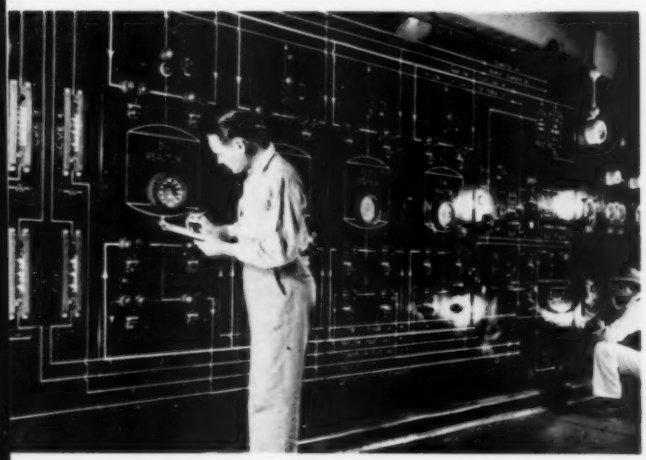
KELLOGG
1901-1951
50th Anniversary

we built in 1901 . . . the first crude vessels for oil refiners in the 'teens . . . our first combination unit . . . the forty-odd Fluid cat crackers built in these years. But, after all, The M. W. Kellogg Company is only a factor as it is able to serve industry today. For that reason, we are presenting this series of monthly camera studies which document our belief that a truly integrated organization can better serve industry to achieve greater earning power. This is No.11 in the series.

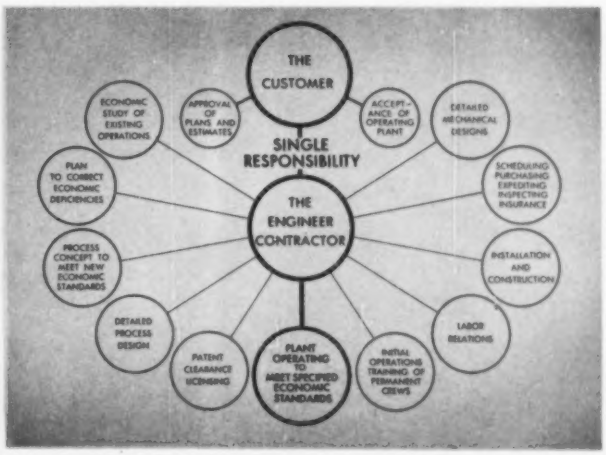
2. ***BOTH THE GAMMA AND X-RAY*** testing equipment, usually associated only with the highest quality shop fabrication, are taken *out into the field* by Kellogg. Originally, much of the equipment was not only specially designed, but in some cases built by Kellogg people. Pictured is one of the company's complete test laboratories-on-wheels.



3. ***COMPLEMENTING THE CONSTRUCTION DEPARTMENT*** is a division that concentrates on the erection, maintenance and repair of radial brick, common brick and concrete industrial chimneys. This activity has been a Kellogg specialty for nearly fifty years, and a complete staff of chimney engineers provides both new chimney design and an inspection service.



6. ***SUBSEQUENTLY, THESE MEN*** go into the field and personally check to see that each part of a new unit is completely operable in accord with design specifications. Then, they stand by in an advisory capacity to the customer's regular operating crews throughout the period of initial operation.

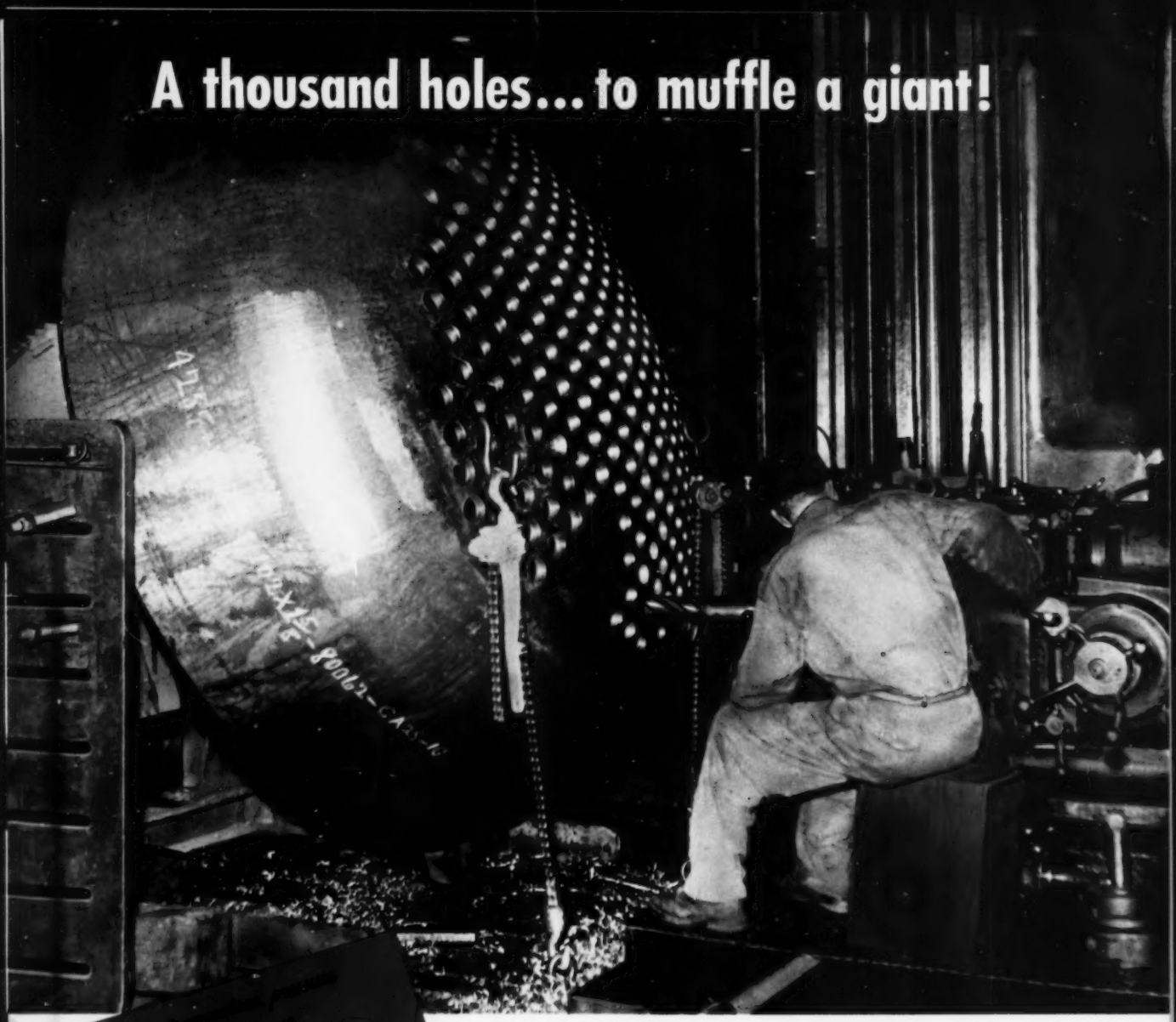

THE CUSTOMER
SINGLE RESPONSIBILITY
THE ENGINEER CONTRACTOR
ECONOMIC STUDY OF EXISTING OPERATIONS
APPROVAL OF PLANS AND ESTIMATES
ACCEPTANCE OF OPERATING PLANT
DETAILED MECHANICAL DESIGNS
PLAN TO CORRECT ECONOMIC DEFICIENCIES
SCHEDULING PURCHASING EXPEDITING INSPECTING INSURANCE
PROCESS CONCEPT TO MEET NEW ECONOMIC STANDARDS
INSTALLATION AND CONSTRUCTION
DETAILED PROCESS DESIGN
PATENT CLEARANCE LICENSING
PLANT OPERATING TO MEET SPECIFIED ECONOMIC STANDARDS
INITIAL OPERATIONS TRAINING OF PERMANENT CREWS
LABOR RELATIONS

7. ***THUS IS KELLOGG COMPLETELY INTEGRATED*** to serve its customers from initial plan to operating unit . . . integrated to provide every factor, that can contribute ***Greater Earning Power*** and ***Greater Value*** to every customer's project.

P. S.

. . . this is the final camera study in the series presented during Kellogg's Fiftieth Anniversary year!

A thousand holes... to muffle a giant!



M. W. KELLOGG

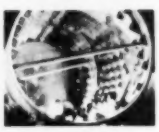
Part of a huge muffler for a giant catalytic cracker, this perforated, dished, stack baffle is symbolic of Kellogg's especial forte in the field of heavy metal fabricating. It's a first of its kind . . . it requires unusual fabricating techniques . . . it's built to close tolerances!

- Pressure Vessels
- Vacuum Vessels
- Fractionating Columns
- Drums and Shells
- Heat Exchangers
- Process Piping
- Hi-pressure—Hi-temp Power Piping
- Bends and Headers
- Giant One-Piece Bends
- Forged and Welded Fittings
- Radial Brick Chimneys

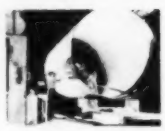
Continuing Study of behavior of metals under stress at high temperatures has produced valuable design data.

Shop Layout Craftsmen are fully experienced in vessel fabrication from nozzle positioning to "knockdown" fabrication for field assembly.

Extensive Facilities from forming of plate to final machining of precision surfaces permit complete fabrication under the same roof.



Special Welding Techniques and stress relieving methods assure equipment performance even under severest operating conditions.



Rigid Quality Control, devised by specialists, including chemical and micro analyses as well as mechanical and non-destructive testing.

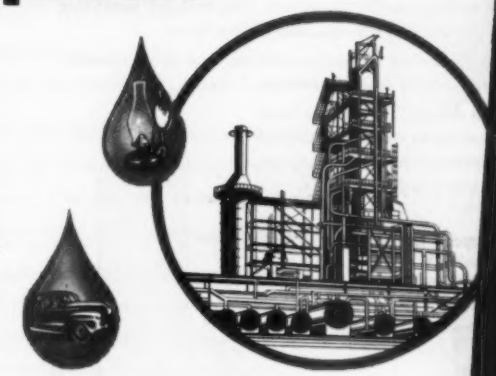
NEWS FOR OPERATORS IN WESTERN CANADA!

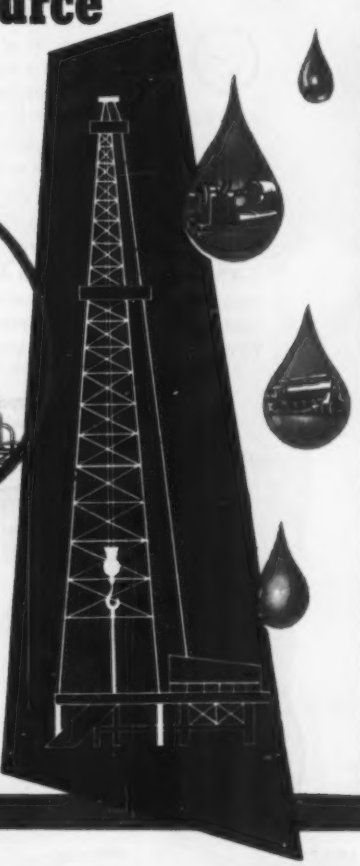
The Canadian Kellogg Company Ltd. has established complete shop facilities for the fabrication of all types of piping at **EDMONTON**, Alberta. Inquire directly or through any Kellogg or Canadian Kellogg office.

The M. W. Kellogg Company *(A Subsidiary of Pullman Incorporated)* **New York, Jersey City, Los Angeles, Tulsa, Houston, Toronto, London, Paris**

STANDARD-VACUUM

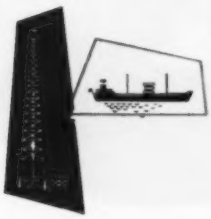
the dependable source for all petroleum products





STANDARD-VACUUM powers, fuels and lubricates the planes, ships and trains... the trucks, tractors and automobiles... industrial machinery, stoves, boilers, lamps, and every other petroleum-using device.

Yes, millions of people throughout the Eastern Hemisphere rely upon **STANDARD-VACUUM** and its affiliated companies—and have, for over half a century.



STANDARD-VACUUM OIL COMPANY

A name that stands for "Progress" in the East

26 BROADWAY, NEW YORK 4, N. Y.

AUSTRALIA • BURMA • CEYLON • HONG KONG • INDIA • INDO-CHINA • INDONESIA
JAPAN • KENYA • MADAGASCAR • MALAYA • NEW ZEALAND • PAKISTAN • PHILIPPINES
PORTUGUESE EAST AFRICA • RHODESIA • SINGAPORE • SOUTH PACIFIC ISLANDS
SOUTH WEST AFRICA • TANGANYIKA • THAILAND • UNION OF SOUTH AFRICA

Bethlehem 600...the pump with the fluid end for extra-high pressures

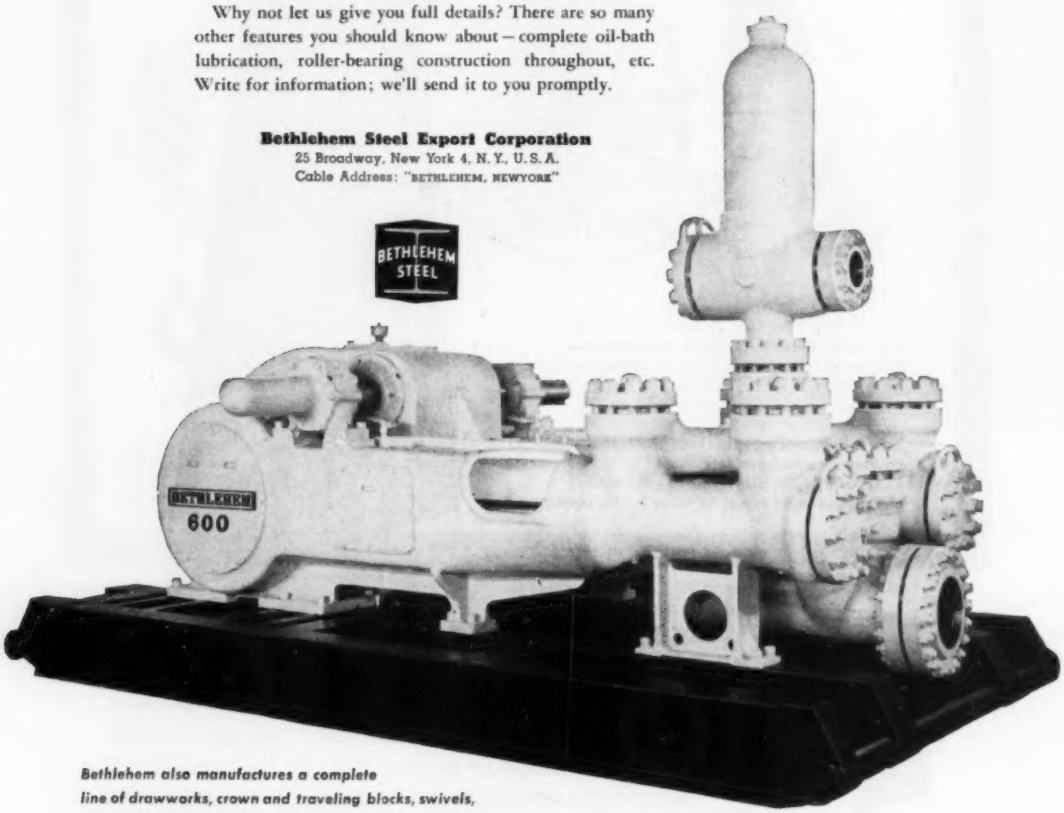
That old reliable of deep-well slush pumps, Bethlehem's 600, is now equipped with a new, superstrong fluid end to handle the pressure extremes so common in modern drilling. The new parts are thicker, more massive; you can appreciate their great strength merely by looking at them.

Even a brief study of this pump will show readily why it withstands high pressures with absolute safety. Just as a starter, consider the gaskets. They're A.P.I. metal-ring type on valve covers, suction and discharge flanges, and stuffing boxes.

But that isn't all. Cylinder walls are heavier. Valve covers too. And the air chamber. Every last part is designed and built for highest pressures.

Why not let us give you full details? There are so many other features you should know about — complete oil-bath lubrication, roller-bearing construction throughout, etc. Write for information; we'll send it to you promptly.

Bethlehem Steel Export Corporation
25 Broadway, New York 4, N. Y., U. S. A.
Cable Address: "BETHLEHEM, NEWYORK"



Bethlehem also manufactures a complete line of drawworks, crown and traveling blocks, swivels, and rotary tables; and, for production work, pumping units in a wide range of sizes and types.

we can handle any job!

That's right, mister.
If it's process construction . . . we can handle it!

Procon has the broad range of experience plus the necessary flexibility to give you the advantages of a practical and efficient construction service covering all types of processing facilities.

For example, current jobs include fluid cat crackers . . . Platforming units . . . fractionators . . . vis-breakers . . . aromatic extraction units . . . gas recovery systems . . . and other types of processing units and plants.

This partial list is certainly an indication of Procon's ability to handle any type of process construction work.

PROCON *Incorporated*

PROCESS CONSTRUCTION

75 EAST JACKSON BLVD., CHICAGO 4, ILLINOIS

AN IDEA in the minds of a small group of courageous men—that was Gulf half a century ago.

Starting as a small producing company with total assets of $750,000 in the late Fall of 1901, it was soon evident that future success was dependent upon Gulf's ability to operate as an integrated company—and to keep building.

Today, Gulf is an integrated world-wide organization with strong holdings in those countries in the free world where the largest crude oil reserves are located. Its growth has been constant, and currently it enjoys the distinction of being eighth in a select list of twelve American manufacturing companies, each with assets of more than a billion dollars.

But, hard-won gains and past achievements are not enough . . . Still needed are more courage, vision and capital, because we're looking forward to the second half-century.

A 200-million dollar expansion of the company's operations in 1951 is well under way. An aggressive program for the discovery and development of crude oil reserves continues. Refineries are being modernized and expanded. Supertankers are being added to Gulf's existing fleet, and other units of the transportation system are being expanded. Additions are being made to the research laboratories. New service stations will be built, existing ones modernized, and other outlets acquired.

All of this is eloquent and concrete testimony that we are planning for the second half-century.

Only by continuous planning and expanding, research, hard work and strict adherence to the principles formulated and followed in the first half-century can we be sure of giving the quality of service and product we desire to give in the next 50 years.

Gulf Oil Corporation · Gulf Refining Company
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PETROLEUM AND ITS PRODUCTS

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QO-Furfural is used in refining lubricating oils, gas oil and catalytic recycle stock; extractive distillation of C_4 hydrocarbons; as a chemical intermediate in the production of nylon, furfuryl alcohol, tetrahydrofurfuryl alcohol and other chemical derivatives; as an aldehyde in resin manufacture and as a reactive solvent.

A request on your letterhead will bring you the Bulletin entitled "Current Uses of Furfural."

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Why is the scrap situation so critical?

An interview with J. L. MAUTHE, *President*
The Youngstown Sheet and Tube Company

Why are you concerned about iron and steel scrap, Mr. Mauthe?

Our inventories are critically low and the present scrap flow is not sufficient to maintain capacity steel plant operations. Furthermore, if the flow of scrap is not increased, a curtailment of steel production is inevitable.

The industry is using all the pig iron and all the home scrap that is available. The balance of our metallic requirements must be made up through procurement of purchased scrap. Every ton of scrap that we do not get represents a ton of steel that we cannot make.

How much scrap does the industry need?

In 1950, 96,700,000 tons of steel ingots and castings were produced, requiring over 61,000,000 tons of iron and steel scrap.

In 1951, over 65,000,000 tons of scrap will be required, and even more will be needed in 1952.

Where does scrap come from?

About 58% of the total scrap required is produced by the ingot and casting makers, and is known as "home" scrap; the balance of 42% is "purchased" scrap and is procured from outside sources.

Purchased scrap generally falls into two categories: Scrap from current fabrication and that which is the result of obsolescence.

There are three important sources from which we get obsolete scrap, much of which is dormant:-

1 - Obsolete machinery and equipment in every industrial plant, at the oil fields and on the farms.

2 - Battlefield scrap, obsolete ships and war material, surplus machinery and equipment, which government can make available.

3 - Countless old automobiles and trucks, which are rusting away in automobile wrecking yards in every section of the country.

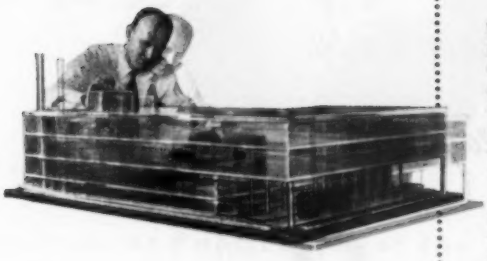
What can be done to increase tonnage of purchased scrap?

This scrap must be made available immediately! All industry and government must awaken to the critical nature of the situation. They must realize that if we do not get the scrap, they will not get the steel!

YOU CAN HELP - YOU MUST HELP!
NO SCRAP - NO STEEL

QUALITY V YOUNGSTOWN SERVICE

The Youngstown Sheet and Tube Company - Youngstown, Ohio



"Model" Grease Plant FOR CANADIAN OIL COMPANIES, LTD.

This lucite, scale model was the "blueprint" used by Fluor engineers to plan and construct the new modern lubricating oil and grease manufacturing plant for Canadian Oil Companies, Ltd., in Montreal. Being able to work out detailed designs in miniature, played a big part in the successful selection and location of all equipment to facilitate the natural flow of work through the plant with a significant saving in man hours. It is an example of the thoroughness with which Fluor tackles a job.

Over 300 varieties of specially engineered greases and lubricants packed in a multitude of sizes, from 3 ounce cans to 55 gallon drums, are manufactured, blended, packaged and stored in this efficient plant. It had to be built in a U-shape to incorporate the original plant which still houses much of the blending machinery. It had to be accessible to all forms of transportation by land or water. It had to provide storage facilities for raw grease stocks before processing and for interior storage of finished products. It had to be equipped with the latest automatic devices for heating, blending, sterilizing, conveying, packaging, handling, etc. and it had to be completed in the shortest time possible.

Fluor's experience with building and remodeling plants which use bulk materials for a variety of products, has long been established, but at Canadian Oil much of the machinery is Fluor designed—especially that used for handling materials. The flexibility of this equipment is almost human in its ability to switch from one type of product to another, from one type of container to another and from one type of carrier to another whether it be truck, box car, tank car, freighter or tanker, without loss of time for change-over.

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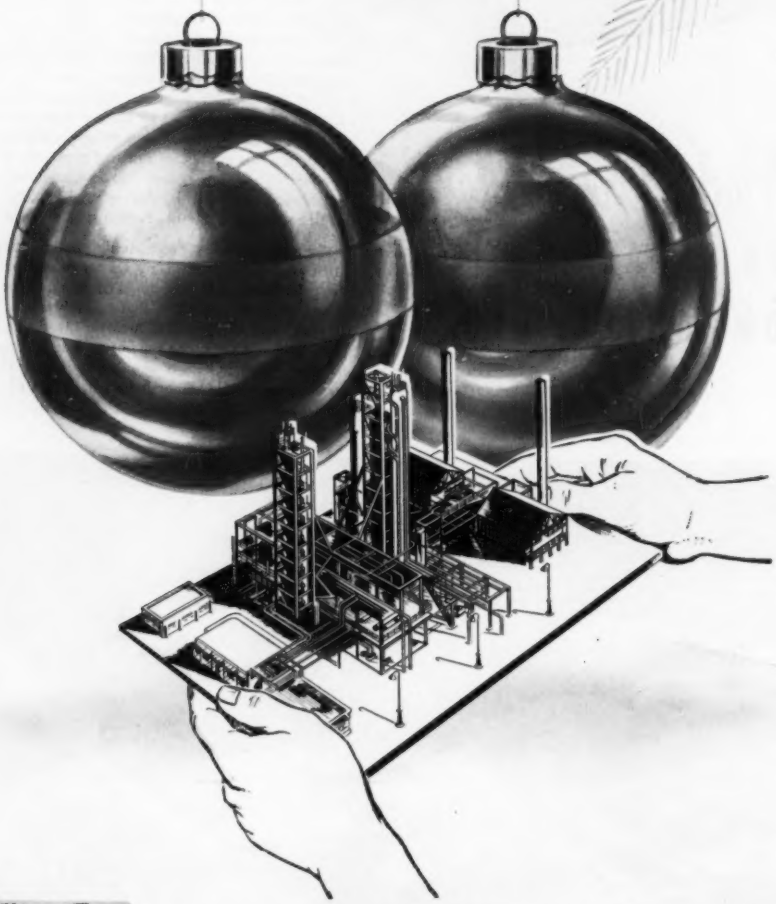
May your Christmas be happy
and the New Year prosperous



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DESIGNING ENGINEERS AND CONSTRUCTORS FOR THE PETROLEUM AND CHEMICAL INDUSTRIES

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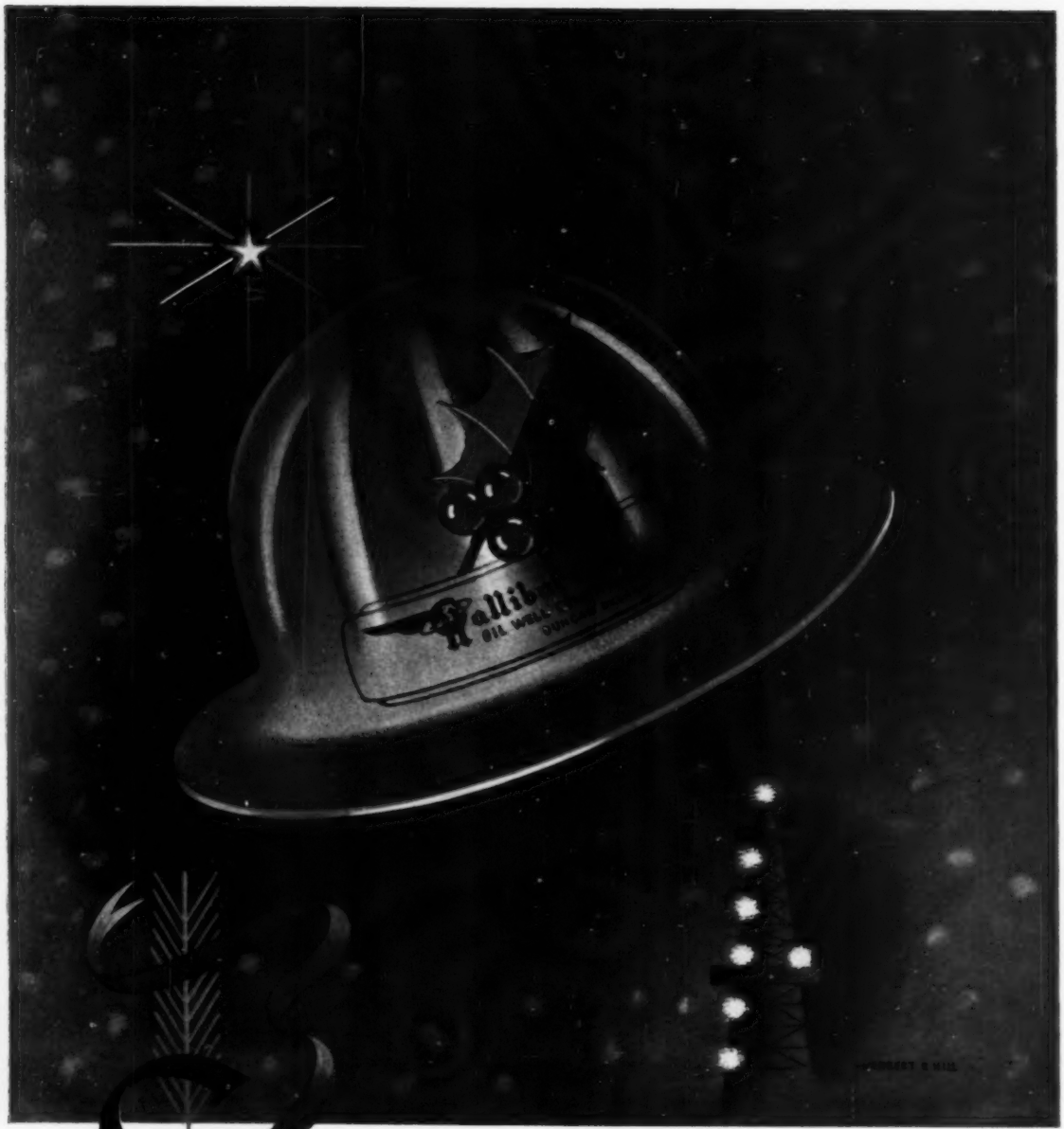
THIS MONTH'S COVER

Exploration crews seeking new oil supplies operate over mountains, deserts and swamps. This month's cover pictures a portable instrument platform erected to give a firm base in the swampy regions adjacent to the Gulf Coast.



Greetings
—from Halliburton

Iran's Deepening Oil Muddle

ABRUPT cessation earlier this year of the flow of Iranian oil into the great stream of eleven million barrels which constitutes the world's daily supply came as a stunning surprise. Because of the sensational feature of its execution it commanded worldwide attention. It must be admitted too that it created deep concern throughout the oil industry. Elimination of 685,000 barrels from the everyday supply of petroleum at a time when the whole industry was extending its efforts to keep output abreast of swiftly rising demand was a grave portent.

Acute apprehension naturally prevailed in those markets which had come to depend mainly on Middle East oil. That designation included nearly all of Western Europe and also important consuming areas east of Suez which could be most conveniently served over tanker routes leading from the Persian Gulf. Only to a slightly lesser degree was it disturbing to the oil trade in other parts of the world.

To the United States it posed a question of national importance in view of the program initiated by the American government of assistance in rebuilding the economy of Western Europe. In that undertaking, petroleum was a principal factor and the whole plan was threatened with a serious setback, if not with complete failure, if Europe were deprived of the oil supply which had been carefully channeled to it from the Middle East.

It is a tribute to the resourcefulness of the oil industry and its ability to meet unforeseen emergencies as they arise, qualities often demonstrated in the past, that most of the disastrous consequences envisioned by Iran's ruthless action have been overcome in a matter of months, as was shown by a review of the current situation in the November issue of this magazine. Increases in producing and refining capacity through the completion of projects that were under way before the Iranian crisis, supplemented by withdrawals from ample refined stocks in the United States, have nearly filled the gap left by the shutdown of Abadan. In fact, a survey of the oil situation as a whole discloses that it is less tense than it was at the time the Iranian debacle began last April. The oil industry has found means of doing without Iranian oil, and from present indications it will be missed less and less as time goes on.

While the naive belief of Dr. Mossadegh and his followers that an oil-hungry world would rush to acquire the proceeds of their brazen banditry has brought them to a perilous position, the problem of Iranian oil has not been solved. The whole world knows now that Iran's ownership of its oil was never in question, that the contract by which the Anglo-Iranian Oil Co. undertook to develop this resource, and in fulfillment of which it had invested hundreds of millions of pounds, has been twice amended to the satisfaction of Iranian officials by increasing the government's share in earnings and that both before and since the arbitrary seizure of its properties the company had shown its willingness to accept further revisions. Iranians themselves have seen the fading of the brilliant mirage of wealth for all which was to become a reality by the simple step of driving out the British who had built the industry and provided the means of making it the main fiscal prop of the nation.

To admit the failure of their reckless course involves unpleasant consequences for the planners which they are reluctant to face. Rejection of the well-meant aid of those who had at heart the benefit of Iran and improvement of the lot of her people has deepened their dilemma. Denial of the authority of the United Nations, although the oil company contract specifically provided for the reference of disagreements to the International Court of Justice which is an arm of the world organization, has closed that door to impartial mediation.

With good will and reasonable accommodation on both sides it would not be difficult even now to work out an escape from the present impasse that would preserve every legitimate right of Iran and help to restore her position in the civilized world. An intransigeant attitude on the part of those who presume to speak for Iran can only lead the country to greater loss and her people to deeper misery. Since physically weak nations have most to lose through defiance of law and justice, they should be the last to indulge in that perilous practice.

Anglo-Iranian

Expands Producing and Refining

THE loss of its oil properties and production as well as its large refinery in Iran, while of major importance to the Anglo-Iranian Oil Co. and the international petroleum industry, has tended to obscure the many other activities of the company external to Iran. A review of these activities is essential to obtain a true perspective of its position. While the company has received a very severe blow, it has been far from a deadly one, owing to the foresight which has been displayed in spreading these activities to other parts of the Eastern Hemisphere.

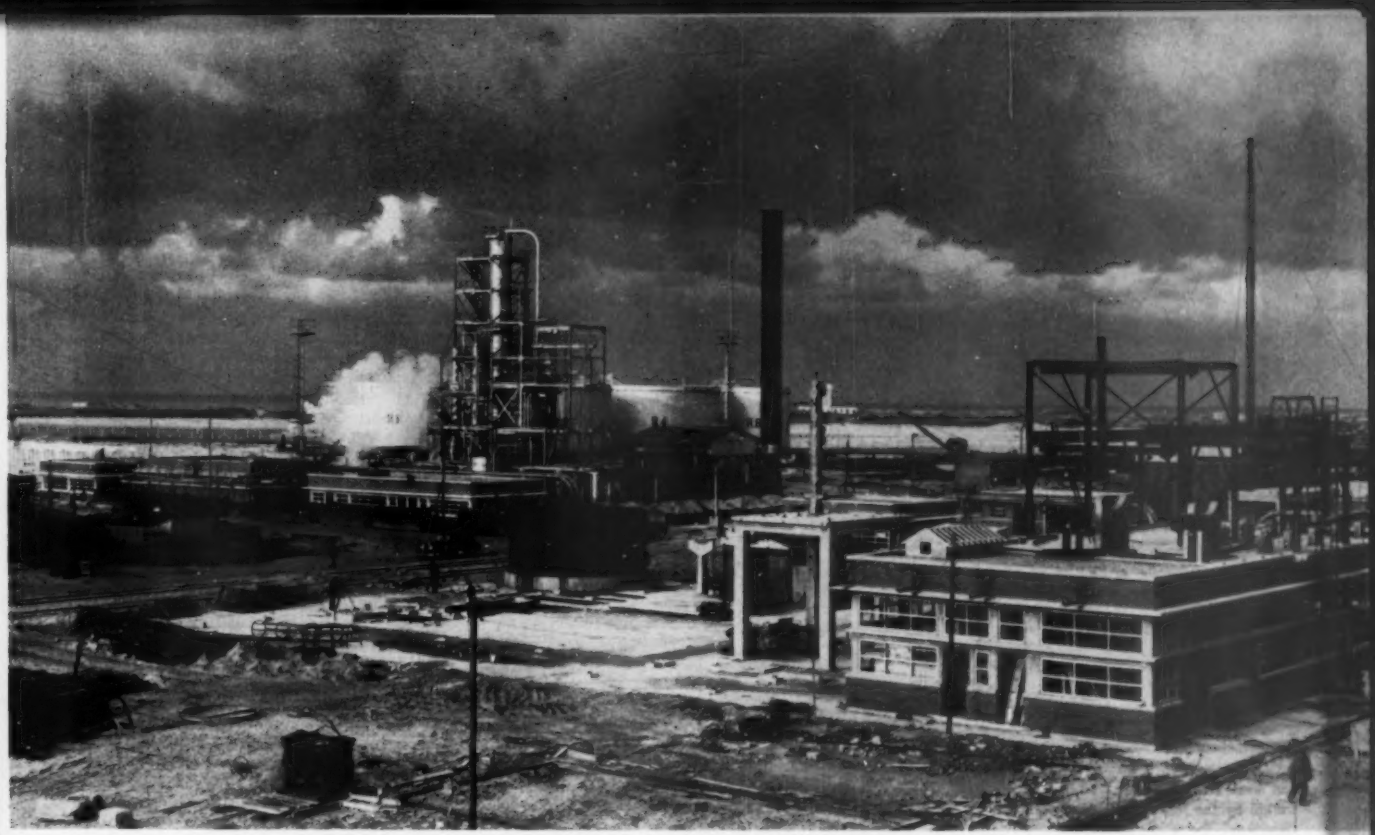
In 1950, the production in Iran was 640,000 b/d, and the refinery at Abadan processed 500,000 b/d of Iranian crude oil as feed stock. These figures represented 77 percent of the company's total oil production, and 80 percent of its refining capacity, the rest of it being spread over a dozen refining plants throughout the world.

Since the shut-down of operations in Iran, these external activities have been rapidly increased, crude production has been stepped up in many ways, none more remarkable than that which has been made in the Kuwait field. Refining capacity has been largely increased as well, both by stepping up production from existing plants in the refineries and in the installation of new refining capacity, part of which is already in operation, and part rapidly nearing completion; so that the blow received by the loss of Iran has been much softened.

AIOC has a half interest in the Kuwait Oil Co. along with the Gulf Exploration Co. (subsidiary of Gulf Oil Corp.). The Kuwait company has an exclusive concession covering the entire State of Kuwait, an area of some 6,000 square miles on the northwest end of the Persian Gulf. Shipments of crude from this field commenced June 30, 1946, the petroleum for 1947 being about 43,000 b/d. Since then the production has advanced by leaps and bounds, and presently the rate of production is about 700,000 b/d and by the end of the year it is expected to reach 800,000 b/d.

The production of Iraq Petroleum Co. Ltd. is divided among certain interests, each nominally taking 23.75 percent, although that of the AIOC is actually rather higher. From the Kirkuk field the production is approximately 160,000 b/d, being restricted to that by the present capacity of the pipe line system. There are two of these lines in operation at present, the original 12-inch line from Kirkuk, which is bifurcated at Haditha, the northern leg having its outlet at Tripoli, and the southern one with its outlet at Haifa. This southern leg has been closed down for some time owing to political troubles. The 16-inch line was originally projected to follow the same route as the 12-inch, but the southern leg from Haditha has not been laid. The northern leg to Tripoli has however been completed and is in operation.

A new 30-inch line, with a projected monthly capacity of over 250,000 b/d, is now being laid from Kirkuk through Homs to Banias, on the Mediterranean, and it is ex-



Societe General des Huiles de Petrole (B.P.) has nearly completed construction of this 28,000 barrel refinery at Dunkirk, France, to replace an 8,500 barrel pre-war plant.

Activities To Compensate for Losses in Iran

By E. L. Lomax

pected that it will come into partial operation early in 1952, but will not operate to full capacity until the end of that year. It is estimated that production from Kirkuk, with the new facilities in operation, will be a minimum of 450,000 b/d by the end of 1954, and 600,000 b/d by the end of 1955.

The small Naft Khaneh field operated by the Khanaqin Oil Co. (AIOC 100 percent subsidiary) produces about 8,000 b/d for the local market.

From the Qatar field the production is steady at a rate of 40,000 b/d. The Busrah (Zubair) field will be coming into production shortly, at an initial rate of 40,000 b/d, which is scheduled to be increased to 160,000 b/d by the end of 1955.

The production from the United Kingdom field at Eakring, Nottingham and Formby, Lancs. is about 900 b/d, while in addition a further 2,200 b/d of oil is produced by retorting oil shale in Scotland.

Summarizing these figures, the following are the prospective amounts of crude oil available to the Anglo-Iranian company for processing external to Iran:

	Barrels Per Day	
	1952	1955
Kuwait	400,000	400,000
Kirkuk	100,000	150 000
Naft Khaneh	8 000	8,000
Qatar	10,000	10,000
Busrah	10,000	40,000
United Kingdom and Shale	3,160	3,160
	531,160	611,160

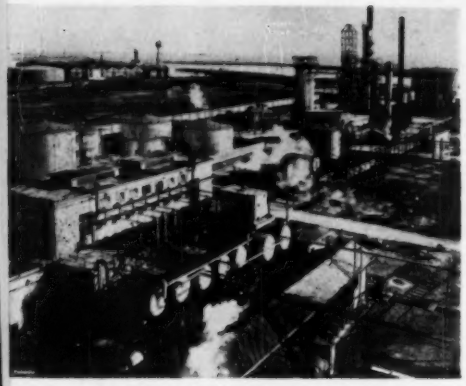
The production of the Anglo-Iranian Oil Co. in 1950 was:

	Barrels Per Day
Iran	635,000
Kuwait	147,340
Iraq	41,300
Qatar	7,600
United Kingdom sources	3,160
	834,400

The loss of crude production by the AIOC due to the deadlock in Iran has stimulated its activities in the search for supplies from other sources. These activities are not all entirely new, nor directly the outcome of the Persian trouble. All supplies from active fields being essentially limited, provision has to be made for their exhaustion long before that event becomes a probability, if the success of the company owning them has to be maintained, and the Anglo-Iranian has been no laggard in this respect. It is at present prospecting, either on its own account or along with other companies, on four continents.

In Iraq, Iran's neighbor, it operates with its partners in the I.P.C. group. In the Independent Shaikdom of Kuwait, at the head of Persian Gulf, the Kuwait Oil Co. operates the Burgan field which has the largest reserves of any known field. It is now producing at a greater rate than was Iran previous to the shutdown, and production is rapidly expanding as shipping facilities are enlarged.

Exploration is going on and has been for some time in India and Pakistan.



Capacity of IROM refinery at Porto Marghera, Italy, jointly owned by AIOC and AGIP, is being increased to 20,000 barrels daily.

In Papua, New Guinea, a large amount of geological and geophysical exploration has been carried out, on the results of which a test well is now being sunk, more than £2 million having been spent on oil exploration in Papua to date.

Before the war the Shell and Anglo-Iranian organizations became interested in Nigeria, and were jointly granted a permit to explore for oil by the Nigerian Government. Exploration work has been carried out over about three-quarters of the 60,000 square mile concession area. Over £1.5 million has already been spent on the search, and recently the first deep well ever to be drilled for oil in Nigeria was spudded-in near Owerri, in the eastern part of the country, under the auspices of the Shell-D'Arcy Petroleum Development Co. of Nigeria Ltd. Reconnaisances are also being carried out in Kenya and Tanganyika.

In Trinidad, Trinidad Northern Areas Ltd., which company's shares are held in equal parts by D'Arcy Exporation Co., Trinidad Leaseholds Ltd. and United British Oilfields of Trinidad, Ltd., is exploring the possibilities of finding oil reserves under the shallow waters of the Gulf of Paria.

Other prospecting is being carried out in Egypt, where there are oilfields on both sides of the Gulf of Suez. Prospecting rights have also been acquired in Sicily, and exploratory surveys are being conducted there.

In the United Kingdom a small amount of shallow production has been obtained in the Formby field. This production is supposedly a filtered oil which has migrated from its original source. Efforts have and are being made to locate the parent supplies, and with this end in view, three test wells are being drilled on the dunes just above high water mark to a depth of 3,500 feet.

These widely spread areas of prospecting show that the company is fully alive to the dangers of too-close concentration of its activities, and to the advantages of spreading them in accordance with future requirements.

Although at the present time the refinery at Abadan, the largest refinery in the world, is denied to the company, yet this is not by any means the only one which it owns, either solely or in partnership with other interests. A majority of these are located close to the markets which they serve, and these, in order that the markets may maintain their supplies, must be fed with the necessary crude for processing. The requirements of these refineries amount to a formidable total.

The Llandarcy refinery in Wales is the oldest refinery outside Iran of the Anglo-Iranian Co. It has been in operation since 1921. Its designed capacity is 60,000 b/d, but since the closure of Abadan the throughput, by reorganization, has been boosted up to 80,000 b/d and is being held at that. Among other products, lubricating oils and wax are made in this refinery.

The Grangemouth refinery in Scotland has a designed capacity of 36,000 b/d, but as in the case of Llandarcy, the throughput has been increased to 45,000 b/d. This increase has been assisted by the completion last year of a pipe line laid across the narrow 60-mile neck of Scotland to give tankers a deep-water discharging depot at Finnart on Loch Long, an arm of the Clyde. Thus the super-tankers of 28,000 and 32,000 tons now building will be able to have a port to serve this refinery.

The original scheme for the erection of the company's Kent refinery was to make it a joint Anglo-Iranian/Gulf Oil proposition, but the Gulf participation has been dropped and it is now solely an Anglo-Iranian project. Prior to the trouble in Persia, the designed capacity of this plant was 40,000 b/d, but it has now been increased to double that amount. Construction work on the project is well advanced, and it is expected to come into production at a rate of 40,000 b/d early in 1952. This rapid progress has been assisted by the diversion of a crude distillation unit, originally intended for the Haifa refinery, to the site. Increased storage capacity is being erected to cope with the expanded design.

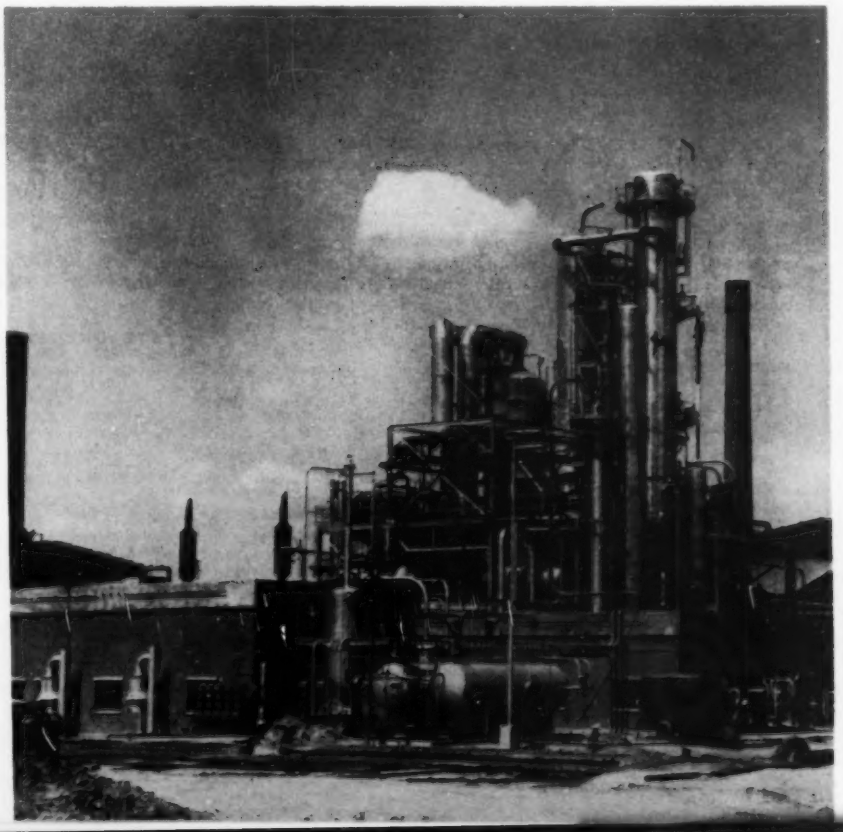
The three major refineries in the United Kingdom are each to be furnished with catalytic cracking plants of 10,000 b/d capacity.

AIOC is active in the production of petrochemicals both directly and through affiliated companies. British Petroleum Chemicals Ltd., which was formed jointly by the Anglo-Iranian and the Distillers Co. Ltd. to manufacture chemicals from petroleum, has erected works at Grangemouth in close proximity to the Grangemouth refinery, which are now producing ethyl and iso-propyl alcohols.

Fort Chemicals Ltd. was formed by British Petroleum Chemicals Ltd. and Monsanto Chemicals Ltd. for the manufacture of monomeric styrene required by the plastics industry. A factory for this purpose is being erected near Grangemouth and is now nearing completion. The Pumpherston refinery in Scotland is manufacturing the detergents "Byprox" and "Comprox" from petroleum.

Outside the United Kingdom AIOC has refining interests in France, Belgium, Italy, Germany, Israel, Iraq, Australia and Aden.

Societe Generale des Huiles de Petrole (B.P.) refines, transports, and markets mineral oils of all kinds for sale in France, its colonies and protectorates. The refineries are at Dunkirk, North France, L'Avera, near Martigues, South France and Courchelettes, near Douai, North France. The latter refinery was badly damaged during the war and its operations have mainly been transferred to Dunkirk. The Dunkirk refinery had a capacity of 8,500 b/d, but this has been increased to 28,000 b/d. The alterations and extensions are practically complete and about to come

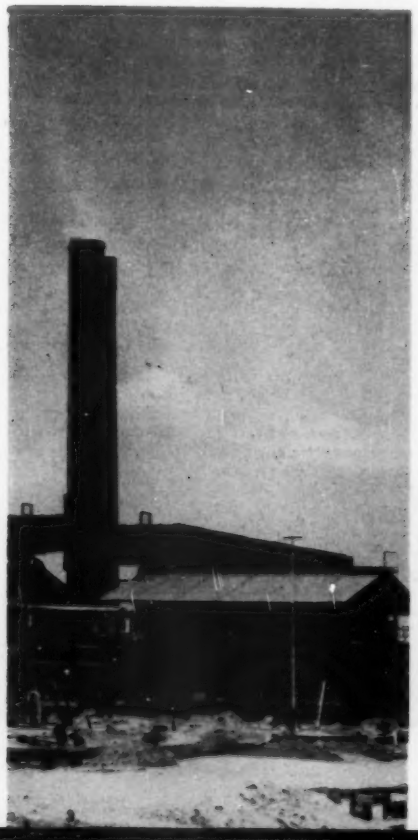


into full operation. It has a lubricating oil capacity of 1,000 b/d. The L'Avera refinery has a capacity of 34,000 b/d and is running to full capacity.

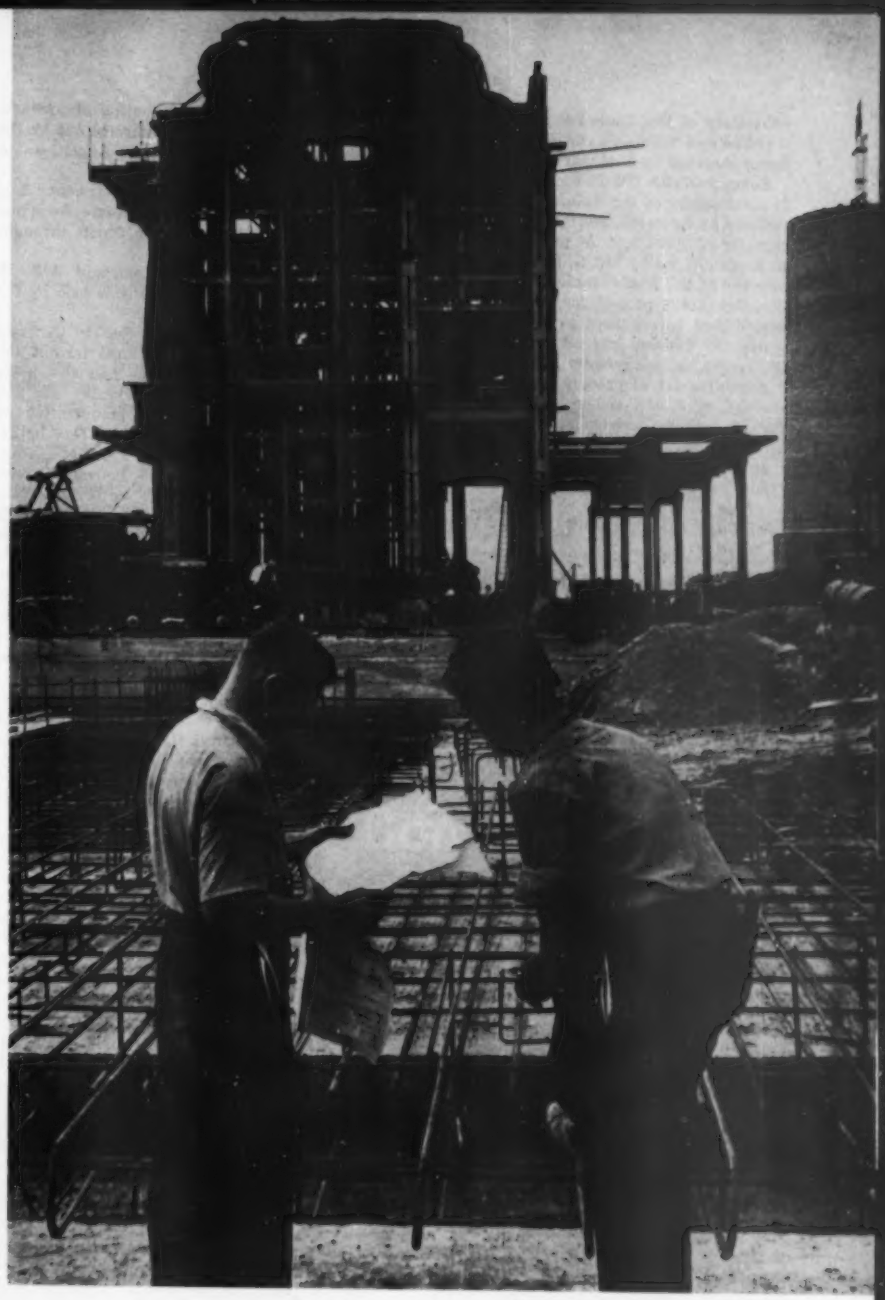
In Belgium the Societe Industrielle Belge des Petroles is jointly owned by Anglo-Iranian Oil Co. and "Petrofina." A new refinery has been built by these companies at Antwerp with a capacity of 27,000 b/d. It is now operating on preliminary tests and will produce premium and regular grade gasoline, kerosine, gas oil and various grades of fuel oils.

In Italy the Industria Raffinazione Olii Minerali S.P.A. is a joint project of the Anglo-Iranian Oil Co. and Asienda Generale Italiana Petroli. The IROM refinery is at Porto Marghera near Venice. It has a capacity of 12,000 b/d and is being modernized and its capacity increased to 20,000 b/d by the installation of a 12,000 b/d combination atmospheric and vacuum unit, a 6,000 b/d thermal reforming unit and a 1,410 b/d catalytic polymerization unit. A 500 b/d lubricating oil unit is also being installed.

In Germany, the B.P. Benzin und Petroleum Gesellschaft M.B.H. is a subsidiary of the Anglo-Iranian Oil Co. It owns the "Eurotank" refinery at Hamburg which has been completely rehabilitated and started operations in February 1949 on a limited scale. Its present input is 13,000 b/d. AIOC has obtained a controlling interest in Oelwerke Julius Schindler, which has two small refineries at Neuhof, Hamburg, and at Peine, near Hanover, the former having a crude capacity of 2,800 b/d, which is being increased to 3,300 b/d by the installation of a 500 b/d atmospheric distillation unit. It also has a lubricating plant of 175 b/d capacity, but has no cracking capacity.



Left: first major refinery to be built in Antwerp with a capacity of 27,000 barrels daily went on stream at the end of September. This is a joint venture of AIOC and Petrofina.



Above: footings were poured recently for the power plant being erected at the AIOC Kent refinery on the Isle of Grain. This will be an 80,000 barrel plant. Partial operations will begin early in 1952. Keystone photo.

Crude capacity after extension will be 4,000 b/d. The Peine installation is a lubricant manufacturing and blending plant with 360 b/d oil blending capacity.

The Haifa, Israel, refinery is a joint project of Shell and AIOC, the latter being in charge of operations. It has a nominal capacity of 80,000 b/d, but was closed down some time ago, when differences between Israel and the Arab countries resulted in the closing down of the southern leg of the 12-inch pipe line of the Iraq Petroleum Co., thus denying supplies of Iraq crude to the plant. It has since been partially recommissioned and is at present running at a capacity of about 1,600 b/d. Owing to the same cause, building of the southern leg of the Iraq Petroleum Co.'s 16-inch pipe line was stopped. At present no decision has been made as to raising the production to normal capacity, but a certain amount of re-conditioning of plant is in hand, in view of the possibilities of increased production.

In Iraq, the Khanaqin Oil Co., which is a

subsidiary of the Anglo-Iranian, is operating a refinery of 7,000 b/d capacity, the products being absorbed by local markets.

Commonwealth Oil Refineries in Australia is a subsidiary of the AIOC. It is operating a refinery at Laverton, near Melbourne, with a capacity of 2,400 b/d. At present a team out in Australia, led by Mr. G. H. Coxon, a senior member of the Anglo-Iranian London staff, is investigating a project for the erection of a new 60,000 barrel plant to be built in Australia. No decision has yet been made as to the location of this refinery.

Anglo-Iranian at present is considering the erection of a new refinery at Aden, but so far no definite decision regarding this has been reached.

It will be seen from these quotes regarding refining capacity, that the following amounts of crude oil are required annually in order to keep these refineries fully fed and running to capacity:

Crude Requirements for Individual Refineries

	Barrels Per Day
Llandarcy	80,000
Grangemouth	45,000
Pumpherston	3,100
Kent	80,000
Dunkirk	28,000
L'Avera	34,000
Antwerp	27,000
Porto Marghera	20,000
Hamburg Eurotank	13,000
Hamburg Schindler	4,000
Haifa	80,000
Alwand Khanaqin	7,000
Laverton	2,400
	423,500

This total is well covered by the present production of the company, and allows for sale of crude or further expansion of refining activities.

The tanker fleet of the British Tanker Co. Ltd. is one of the largest external assets of the AIOC and will undoubtedly be retained by the company. A large portion of this fleet was on the Persian Gulf service when matters came to a head in Iran, but in very little time the sailing program was re-orientated, and at present the whole fleet is fully occupied in the company's service. It consists at present of 152 ocean-going vessels with a total deadweight tonnage of 1,827,422. In addition, the following vessels are either under construction or on order:

5	vessels of 28,000 dwt—	140,000 tons
1	vessel of 12,500 dwt—	12,500 tons
6	vessels of 32,000 dwt—	192,000 tons
12	vessels of 16,000 dwt—	192,000 tons
3	vessels of 14,000 dwt—	42,000 tons
27	Total	578,500 tons

Sales and distribution activities of AIOC require an organization of major importance. AIOC marketing operations are spread over a wide area, including Europe, Africa, Australasia and the Near and Far East. A list of the principal distributing companies follows:

Australia: Commonwealth Oil Refineries Ltd., owned by the Anglo-Iranian, has ocean installations at Melbourne, Sydney, Newcastle, Port Kembla, Brisbane, Townsville, Darwin, Adelaide, Freemantle and Hobart, with service stations spread over the continent. The products are sold under the brand C.O.R.

New Zealand: British Petroleum Co. of New Zealand, Ltd., is owned 51 percent by the New Zealand government and 49 percent by Anglo-Iranian. It distributes over the whole of both the islands.

United Kingdom: Distribution of products in the United Kingdom is carried out by the Royal-Dutch-Shell and the Anglo-Iranian groups.

Austria: B. P. Benzin und Petroleum A.G.

Belgium: B. P. Belgium Societe Anonyme has storage and distribution depots throughout Belgium.

Denmark: B. P. Olie Kompagni A/S. A large interest in this company is held by the Anglo-Iranian.

France and its colonies: Societe Generale des Huiles de Petrole (B.P.) carries out distribution throughout France and also holds interests in Compagnie Francaise des Petroles, Societe Havraise de Manutention de Produits Petrolier, Comptoir des Gas Industriels, Societe Nationale des Petroles d'Aquitaine, Soc. des Depots de Petrole Cotiers, Naphthachemie, Soc. Nat. de Petroles du Languedoc Mediterranean, Soc. des Huiles de Petrole "B.P." d'Algerie, Soc. des Huiles de Petrole "B.P." de Tunisie, Soc. des Huiles de Petrole "B.P." du Maroc, and Steaua (Agencies) Ltd.

Germany: B. P. Benzin und Petroleum G.M.B.H. is a subsidiary of Anglo-Iranian and owns refineries, storage depots, service and filling stations.

Holland: Benzine en Petroleum Handel Maatschappij. All shares held by AIOC. The company has depots at Petroleumhaven, Amsterdam C, 2C Petroleumhaven, Pernis, Rotterdam, Schiepol Aerodrome, Amsterdam, and ocean tank installations at Amsterdam and Rotterdam.

Iceland: B.P. A. Islandi H/F Ltd., affiliated with AIOC, is owner of storage and distribution facilities for petroleum products in Iceland.

Italy: Benzina Petroleum (B.P.) S.A.I., importers and distributors of petroleum products, has installations at San Sabba petroleum harbor, Trieste, with storage capacity of 24,030 cubic meters. A large interest in the company is held by AIOC.

Loch Long jetty and tankage where AIOC supertankers unload crude for pipeline transportation to the greatly enlarged refinery at Grangemouth, Scotland.

Luxemburg: B.P. Luxemburg.

Norway: Norsk Braendselolje S. A., large interest held by AIOC.

Sweden: Svenska B.P. Oljeaktiebolag. This company is owned by AIOC.

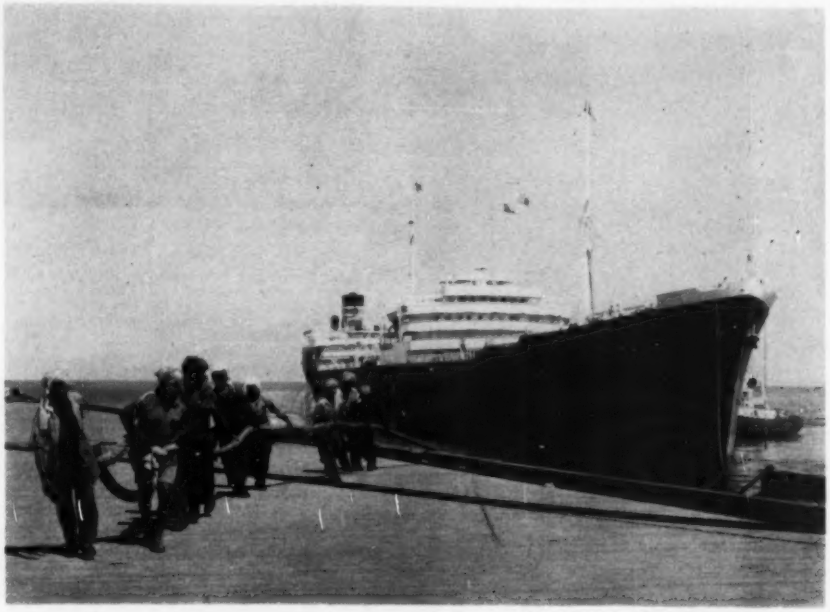
Switzerland: B.P. Benzin und Petroleum A.G. AIOC is interested in this company which distributes petroleum products throughout Switzerland.

India and Pakistan: Distribution carried out by the Burmah-Shell group. In the Middle East, Ceylon, Egypt, South and East Africa, distribution is carried out by the AIOC/Shell Consolidated Petroleum Co.

B.P. aviation service operates through subsidiaries and agencies.

B. P. bunkering service is carried out through individuals and agencies in over 160 ports throughout the world.

The 28,000-ton "British Adventure" being docked at Mina el Ahmadi, Kuwait, on her maiden voyage in October. The new tanker has a cargo capacity of 215,000 barrels.



Federal Control Through the Backdoor

By Ruth Sheldon Knowles

THE roar with which natural gas emerges from the southwest's great fields is being matched today by the political and industrial uproar caused by its dramatic rise to the place of supplier of one-seventh of the nation's energy.

This giant young industry, which is expanding at the rate of a billion dollars yearly, is rapidly becoming the center of the greatest controversy over federal control in which any natural resource has yet been embroiled.

Alarm has now supplanted the optimism of gas producers who thought that at long last their product, once flared futilely in open air for lack of markets and transportation, had come into its own. Their concern over the situation was summed up in a recent speech in Kansas City by K. S. Adams, chairman of Phillips Petroleum Co., who charged that "self-styled champions of the consumer" are "trying to hoodwink the public into believing that federal control will mean more gas at lower prices, whereas actually it would mean less gas at higher prices."

It is not surprising that the public is susceptible of being taken in by the promise of cheaper fuel under a confused federal regulation when confusion exists even among some oil men. The president of a large gas producing company recently received a letter from a prominent southwestern oil executive asking what he could say to friends when he was visiting in the north who maintained that the natural gas companies were victimizing the public with excessive prices and should not be permitted to "evade" federal control.

It is time that both the oil industry and the public should take a look to see what the "hoodwinking" is all about. If the natural gas producing industry is infected by federal control, can any innoculation be expected to save its Siamese twin, the oil industry, from catching the same disease? And if these basic natural resource industries are maneuvered out of the hands of free enterprise, how many barriers would remain to prevent the American dream of democracy from turning into the nightmare of socialism?

If a bill were introduced in Congress to nationalize all natural resources, there would be a great outcry from those who believe in a free competitive system. In the case of natural gas there has been no such straightforward attempt. Instead, advocates of federal control have followed the devious course of attempting to establish control through strained interpretations of existing legislation. This effort, which began five years ago, set off so many millions of words of complicated legal wrangling in Congress and Federal Power Commission hearings that it is no wonder the issue is thoroughly confused.

The threat of federal control has come with realization of the natural gas industry's importance. Once considered a nuisance and a useless by-product of America's oil wells, billions upon billions of cubic feet of natural gas were flared. The oil driller who first pricked the great bubble of gas underlying parts of Oklahoma, Kansas and Texas, plugged the hole in disgust because no oil came out with the gas. It was a repetition of the oil industry's earliest days when kerosine was its only marketable product and gasoline was a bothersome side issue.

The oil industry's once-unwanted step-child is now papa's rival as a supplier of energy. It is even predicted that in the future more gas than oil will be found. Deeper drilling now is finding more gas proportionately than oil. Natural gas reserves already known ultimately will provide twice as much energy as known oil reserves. At present consumption rates, known gas reserves will last 27 years; and to cap the picture of abundance, Lyon Terry, geologist and gas expert of the Chase National Bank, estimates undiscovered gas reserves will be twice that much.

The tremendous postwar boom in transcontinental pipe lines has made natural gas available to more than 14 million homes in almost every major city in the United States. Due to its cheapness and efficiency the demand is steadily increasing. Even now there are more miles of natural gas pipe lines criss-crossing the continent than there are miles of railroads; projects awaiting Federal Power Commission authorization would increase this pipe line capacity by a third.

The number of home consumers sounds large, but factories and industrial plants use four and a half times more natural gas. Industry not only uses it as fuel to process everything from buttons to steel, but its use is the foundation of a new, fast growing chemical industry. One engineer calls it "the most desirable chemical raw material the world has yet seen." Dr. Gustav Egloff, noted petroleum chemist, says, "If we start with natural gas, all the known synthetic products that man has developed in organic industry can be derived—and there are over 500,000!" Already there are being made from natural gas all sorts of plastics, synthetic fibers, fertilizers, ammonias, alcohols, benzene, toluene and synthetic rubber.

A tug-of-war is already developing between home consumers and industrial users over the available supply of natural gas, and the most decisive factor in that tug-of-war is the threat of federal control.

The fear of federal control is already keeping out of the national market large quantities of natural gas which would otherwise be available to home consumers. The fear of federal control is also changing the industrial geography of the nation. Since gas producers and gatherers are reluctant to sell their gas to interstate pipe line companies, fearing this will make them subject to federal control, industry is moving to the gas. Eighty percent of all the chemical plants built in the United States since 1940 have been built in the natural gas producing states of Arkansas, Louisiana, Oklahoma and Texas.

The hole in the tent through which the camel of federal control has stuck its nose was an ambiguous decision of the Supreme Court in 1947 in which it implied that the provisions of the Natural Gas Act of 1938, including control of prices, should apply to the natural gas producer and gatherer inside state lines when he sold his gas to interstate pipe line companies.

Without the attempt to push the tentacles of federal management inside state lines there was ample regulatory authority to deal with unreasonable charges. Pipe line companies transporting natural gas from producing states to the city gates of communities throughout the nation are federally controlled under the Natural Gas Act to prevent excessive charges for this transportation since such great investments are required that competition in reaching some consumers is scarcely feasible. For the same reason, state and local authorities control the public utilities companies who distribute gas to individual homes.

When the Natural Gas Act was passed, Congress had no intention of regulating the highly competitive natural gas producers and

gatherers. Every Congressional member connected with it confirms this fact today, including veteran Speaker of the House Sam Rayburn, who was on the sponsoring committee. The Congressmen thought they had specifically excluded the natural gas producers and gatherers from jurisdiction of the Federal Power Commission, but they reckoned without the art of legal semantics in the hands of those who would like to read into legislation something that wasn't intended.

The implication in the 1947 Supreme Court decision that the Natural Gas Act could apply to gas producers and gatherers caused as much confusion and frantic activity as splitting open an ant hill. Gas producers were alarmed as the Federal Power Commission had already established price control over producing gas properties owned by interstate pipe line companies. Its action was upheld by a bare majority of the Supreme Court, and dissenting Justice Jackson termed the FPC method of figuring value as "capricious," "delirious" and "fantastic." Their method results in some instances in three different prices for gas from the same well, one price permitted the regulated pipe line company as part owner, and higher prices to the unregulated partner and to the landowner.

A "fantastic" case is that of one pipe line company which owns over 68,000 acres of leases in the Panhandle field, one of the most valuable proven gas reserves in the world, but these leases were put in the rate base at a valuation of zero by the FPC because the company had not paid any bonus consideration for them. Another company has five leases containing gas reserves with a market value of over three million dollars. However, the FPC allows it a return of $300 a year on two of the leases and 6½ percent of zero on the other three, which were bought before gas was discovered on them.

Independent gas producers and gatherers protested that if the FPC type of price control were extended to them it would be the equivalent of confiscating their properties.

The Federal Power Commission, which had never believed it had the power to regulate the independents, joined in supporting one of the many bills introduced in Congress to clear up the confusion caused by the Supreme Court. From 1947 to 1950, Congress stalled every bill on the subject, while the situation became more confused than ever, with FPC policy changing as its membership changed.

Photo by Bubley for Standard Oil Co. (N.J.)

Gas producers were reluctant to enter into contracts with interstate pipe lines, particularly after what happened to Delhi Gas Co. of Dallas, Texas. Delhi had contracted to supply a new pipe line taking gas from Texas and New Mexico to Arizona and California. The FPC had advised Delhi that it would not be brought under federal regulation by selling this gas. However, when former Commissioner Leland Olds announced that after much study he had changed his mind and had come to believe that the FPC could and should regulate independent producers, Delhi asked again about its status. This time the FPC advised it could not express an opinion as to whether Delhi would or would not be subject to federal regulations. Delhi cancelled its contract with the new pipe line.

Larger and larger gas reserves were being withheld from the national market and most contracts that were made included the right of the supplier to cancel if federal regulation were established.

This unhealthy situation was the reason for the introduction of one of the most controversial bills put before Congress last year, the Kerr bill. This bill, amending the Natural Gas Act, was designed to end the confusion and spell out in primer language that Congress had no intention of regulating competitive gas producers.

Inspired by advocates of federal control, among them Senator Paul Douglas of Illinois, who once recommended socializing the ownership of the gas industry, various newspaper columnists and radio commentators had a field day warning consumers they were about to be gouged in a billion dollar "gas grab." Publicity given to the issue was so one-sided that Senator Fulbright of Arkansas declared in the final debate, "It is a great reflection upon the integrity of our press and our so-called columnists that the arguments and viewpoints of those who favor this bill have been ignored and suppressed."

Congress passed the bill, but President Truman, faced with the November elections and perhaps influenced by the pleas of congressmen who maintained that public opinion was so aroused that they would be defeated if it became law, vetoed it.

Accepting the veto as a mandate to go ahead and exercise control over independent producers, the FPC moved in and began a test case to investigate whether or not Phillips Petroleum Co., of Bartlesville, Okla., an independent oil and gas producing company and largest single owner of gas reserves in the country, was subject to FPC jurisdiction since it sold gas to interstate pipe line companies.

In August last, after a seven-week public hearing with 6,000 pages of testimony, the Commission decided by a four to one majority that Phillips was not subject to its control. The decision, however, probably will be appealed to the courts.

In spite of the decision in the Phillips case, the issue of federal control remains unsettled and will continue in that state until specific Congressional legislation clarifies the situation. Decisions as to how to interpret the Natural Gas Act lies in the arbitrary opinions of the five commissioners of the Federal Power Commission, whose thinking on the issue is at present bitterly and openly divided. Furthermore, FPC membership is changing again. Chairman Wallgren has resigned, and a behind-the-scenes political battle is being waged over appointment of his successor. Advocates of federal control want a majority on the Commission with a new member to join the combination of Commissioners Thomas Buchanon and Claude Draper, who have held that FPC should control gas producers. The Draper-Buchanon combination is likely to continue, although in the Phillips case Commissioner Draper did not support the proposal for federal control. Gas producers still remain uncertain from one day to the next as to whether or not they will be subject to the variations of commission thinking.

During the Phillips' hearing, the heart of what the columnists called "the great gas grab" was clearly revealed. Attorneys representing the Public Service Commission of Wisconsin, the cities of Kansas City, Milwaukee and Detroit, all of whom receive gas bought from Phillips, argued hotly that the FPC should control Phillips so that the communities they represent could be protected against any increase in gas prices.

Chairman Wallgren finally lost his temper, telling the Wisconsin attorney that the Commission was getting tired of people telling the FPC that it is responsible for high costs of gas. "The people of Wisconsin should be glad to get the benefit of natural gas service," he said, but he wanted to know why the local utilities commission wasn't passing the benefit on. He commented that the rate for manufactured gas was at least a dollar per thousand cubic feet in Wisconsin, whereas natural gas at the city gate was 28 cents. Homeowners pay as high as $1.50 to $2.59 for the same gas. He could see no logic in Wisconsin's complaining that Phillips was receiving 8½ cents of that "when you should have cut the rate up there as a result of natural gas service and you haven't done it."

The fear that natural gas prices will go up if the FPC does not exercise or obtain federal control has been the chief argument of control advocates. Prices in the field have risen moderately because of the widening demand, but they are still abnormally low by comparison with others, due to the fact that it has been only in the past few years that natural gas has had a real market. However, as Chairman Wallgren emphasized, the producer's share of the homeowner's gas bill is only a fraction. The southwestern producer gets an average of six cents out of every $1.50 an eastern homeowner pays for natural gas.

The hue and cry over price as a justification of federal control of the gas producer and gatherer is not consistent with the fact that natural gas is the cheapest, most efficient fuel available. It is significant that the higher prices of fuel oil and coal are not used as an argument for federal control of these industries. In the case of gas, the planners have found a crack in the door through which they hope to enter the premises. A principal objective of believers in a planned economy is public ownership of all natural resources. Achieving regulation of gas producers would be a major step toward such an objective. It is noteworthy that natural gas is the only resource which at present offers the possibility of extension of federal control without the necessity of passing positive legislation to achieve it.

The natural gas industry already offers a

perfect example of what federal control of independent gas producers and gatherers would mean to the nation in terms of abundance or scarcity of supply. Practically all new gas reserves are discovered only by unregulated producers and gatherers.

Regulated natural gas companies have little or no incentive to risk capital in exploration for new reserves. Nor, under regulation, is it possible to receive sufficient returns from a successful discovery to pay for the average of eight dry holes drilled in search of it. During 1948 and 1949 the 35 regulated natural gas companies operating in the seven-state southwestern area together spent only $6,510,000 for exploration. Phillips alone spent $62,600,000 during the same period.

In the hazardous and highly competitive business of exploring for oil and gas, regulation would result in less exploration and fewer discoveries. The United States is a great oil and gas producing nation, not because its rocks contain more oil and gas than other nations, but because its oil and gas finders have drilled 100 times more wells in search of oil and gas. They have drilled so many wells, not because they are more persistent than the men of other nations, but because they have been free to explore and compete.

Gas producers are deeply disturbed by the lack of public knowledge and understanding of the facts of this vital federal control controversy. In his Kansas City speech, Phillips Chairman Adams pointed out that Kansas City, confronted as it is with an industrial crisis resulting from the recent flood, should be in the forefront of the fight against federal regulation so that new supplies of natural gas will not be driven from its gates. "Instead, surprising as it may seem," he said, "Kansas City has been playing a leading part in the effort to establish federal control of natural gas production. To further that end it has officially intervened in the Phillips proceeding before the Federal Power Commission. It is thereby aiding in erecting a barrier between its sources of gas supply and its industries. It is choking off the life-blood of its industrial progress!"

Repetition of indiscriminate attacks on business has led some Americans to believe that industries plead only for special interests—their own. This has dulled the sensibility of the average person, making it difficult for him to judge what does or does not threaten his free way of life. It is easier to understand the principle of freedom as a motive for fighting on a Korean battlefield than it is to understand the fight for that same principle of freedom in a federal agency hearing or on the floor of Congress.

If America is to win the over-all victory of remaining a free people, an informed public (aided by an informed industry) must realize that freedom must be fought for wherever it is threatened. To advocate federal control of a natural resource industry under the illusion that it might reduce the monthly gas bill would indeed be selling the consumers' birthright for a bowl of lentil pottage.

Gas flares are rapidly disappearing in the United States as the natural gas industry enlarges its distributing system and the oil industry increases its repressuring program. Photo courtesy Standard Oil Co. (N.J.)

Vast Steel Expansion In Progress

THE oil and steel industries, partners in war and peace, continue to match each other stride for stride in the race to keep up with consumer and defense demands for their vital products. Just as the steel industry depends upon oil for fuel and lubricants to manufacture and deliver its raw materials and to provide the motive power for the principal consumers of its product, the automotive and railroad industries; so the oil industry depends on steel from the moment the drilling bit begins to turn until the hose nozzle delivers the finished product to the consumer.

The steady growth of the steel industry through the war has continued through the past six years to contribute much toward better living standards and the national strength. The more than 500 million tons of steel produced since the end of World War II have helped make 31,500,000 motor vehicles, 22,500,000 refrigerators, 19,000,000 washing machines, 23,000,000 stoves and ranges, 3,000,000 farm tractors, 5,400,000 non-farm dwellings, 60,000 miles of pipe lines, and 400,000 freight cars. In the three years since 1948 alone, hot rolled sheet and strip capacity has risen 30 percent through steel companies' expansion and improvement programs.

The huge expenditures which such expansion requires are being made in the face of sharply increased equipment and construction costs, and sums spent and contemplated for even further expansion since 1946 will approach by 1952 a figure approximating the total capital investment in the steel industry at the end of 1946. Expenditures for expansion and improvement in recent years are as follows:

1946	$291,000,000
1947	496,000,000
1948	583,000,000
1949	510,000,000
1950	513,000,000
1951	1,200,000,000 (estimated)

These expenditures, financed partly through loans and from prior earnings and to some extent through sale of bonds to the public, are equivalent to $24.50 for every man, woman and child in the country.

Assisting in steel's tremendous production increases has been an industry-wide program to make the fullest and most efficient use of existing plant facilities. Scores of changes in equipment, planning, training, and standardizing have contributed their share to a recent record output of two million tons of ingots in one week. Increased attention to personnel through job training programs, standardization of operating procedures through time studies, elimination of unnecessary operations, more efficient materials handling, the stretching of supplies of critical metals through development of leaner alloys, use of better coke, recovery processes for captured dust—these and many others indicate the industry's conscientious devotion to the performance of an important mission.

Table I shows what have been the results of these expansion and improvement programs for this year contrasted with 1939 capacity, and indicates further increases to be expected from projects currently building or to be built by 1953.

TABLE I
STEEL INGOT CAPACITY IN THOUSANDS OF NET TONS

	1939	1951	1953
Eastern District	16,161	20,823	24,210
Pittsburgh-Youngstown District	34,951	41,412	45,090
Cleveland-Detroit District	7,760	9,602	12,000
Chicago District	17,996	21,523	23,970
Southern District	2,829	4,913	6,060
Western District	2,131	5,957	6,670
Total	81,828	104,230	118,000

Plans for enlarging blast furnace facilities, coke oven capacity, rolling mills and other finishing facilities are expected to make possible, by the end of 1953, an output of about 118 million tons. Production may even rise further, to 119.6 million tons, if government production authorities allow the industry to use a larger part of its product for its own expansion. Table 2 shows new and improved facilities by individual companies for blast furnaces and open hearth and electric furnaces.

TABLE II
STEEL INDUSTRY CONSTRUCTION

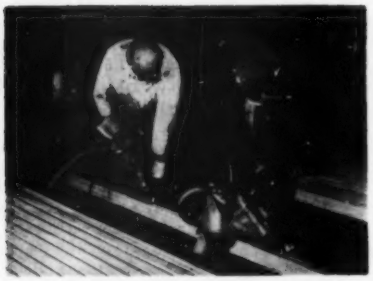
Company	Additional annual capacity, net tons: Blast Furnaces	Open Hearth & Electric
Armco Steel	505,000	700,000
Atlantic Steel	—	100,000
Bethlehem Steel	500,000	1,600,000
Colorado Fuel & Iron	45,000	325,000
Crucible Steel	500,000	250,000
Detroit Steel	500,000	630,000
Granite City Steel	—	380,000
Green River Steel	—	190,000
Inland Steel	—	750,000
Jones & Laughlin	50,000	2,340,000
Kaiser Steel	—	180,000
Keystone Steel & Wire	—	100,000
Lone Star Steel	—	500,000
McLouth Steel	—	140,000
National Steel	980,000	200,000
Pittsburgh Steel	—	520,000
Republic Steel	530,000	732,000
Sharon Steel	290,000	386,000
Tennessee Products & Chem.	300,000	—
United States Steel	1,312,000	2,140,000
Universal-Cyclops	—	16,000
Washburn Wire	—	36,000
West Virginia Steel	—	87,000
Woodward Iron	265,000	—
Youngstown Sheet & Tube	500,000	1,225,000
Totals	6,277,000	13,527,000

Some observers believe that the steel industry now is within about five percent of supplying steel requirements of the rearmament program and of necessary civilian goods. New capacity now planned and under construction is thought to be ample to take care of the government's present program (assuming that there is no all-out war) and to keep the civilian economy reasonably well supplied. There undoubtedly will be maladjustments in supply—too much of one type of steel, too little of another—but an essential balance appears to be in prospect within a short time.

Pouring molten iron from a 50-ton ladle. Photo courtesy American Iron and Steel Institute.

Estimate Steel Requirements of Million Barrel Oil Industry Expansion

By Joseph B. Huttlinger



Removing surface flaws from hot rolled billets.

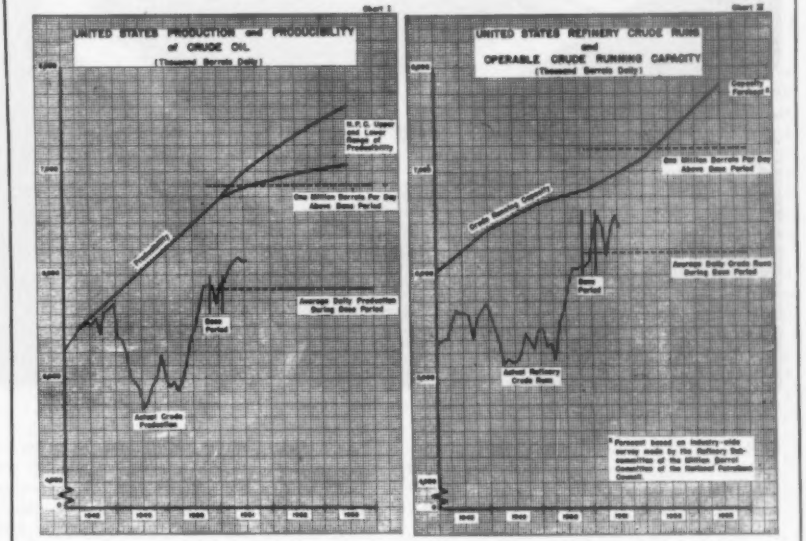


Chart I
UNITED STATES PRODUCTION and PRODUCIBILITY of CRUDE OIL
(Thousand Barrels Daily)
Chart II
UNITED STATES REFINERY CRUDE RUNS and OPERABLE CRUDE RUNNING CAPACITY
(Thousand Barrels Daily)

N. P. C. charts suggesting desired levels of crude availability and refinery capacity.

WASHINGTON

A YEAR AGO, in January of 1951, the Interior Department's Oil and Gas Division asked the National Petroleum Council to determine the cost in steel and dollars of increasing the output of the petroleum industry in this hemisphere by a million barrels daily of products. The council appointed its so-called "million barrel" committee, which now has made its report to the government.

Chairman Dr. Robert E. Wilson of Standard Oil Co. (Ind.) and his committee reported that a total of 3,231,000 tons of steel is needed to do the expansion job. The figure would be higher but for the fact that an extra 500,000 barrels daily of crude production was made available in the United States, during the period covered by the study, merely by opening up of bottlenecks such as inadequate pipe line outlets. A total of a billion dollars is required for the task, the committee went on, a figure which is exclusive of exploration and production costs, which cannot be estimated.

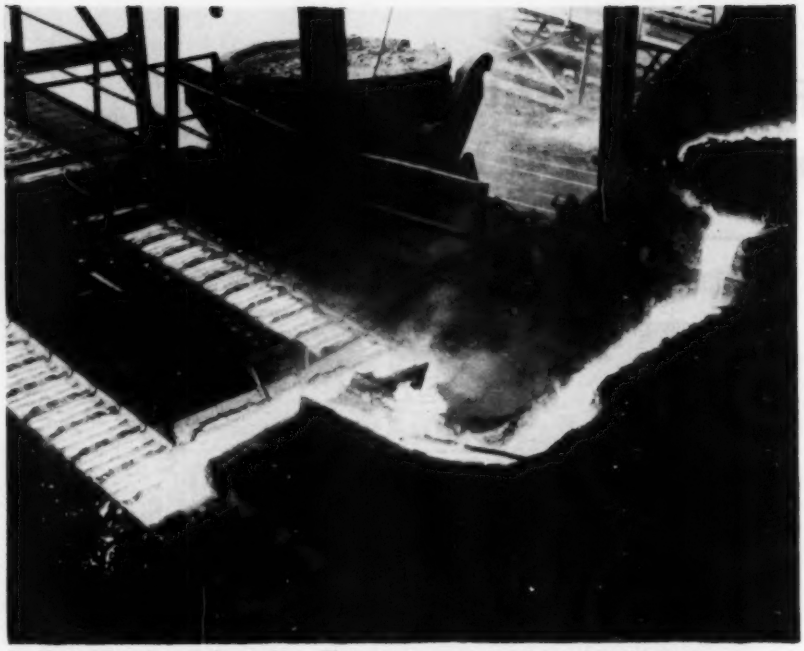
A great expansion in production already has taken place, the council's report pointed out. In fact, it said, "more than this amount of expansion will be accomplished before the end of 1952 if adequate steel supplies are available." The report pointed out that there is no question of the ability and willingness of the industry to expand with its own funds, although there is some question about the supply of steel that the government is parceling out to the industry to do its expansion job.

A further expansion of the petroleum industry, well beyond one million barrels daily of production over the year-ago levels, is sought by the Petroleum Administration for Defense. It is for this expansion, sometimes called the "second million" that the council's study may serve as a "greatly useful report, containing up-to-date estimates of the steel needed." The words are from Bruce K. Brown, deputy director of the PAD, who says the figure will serve to put to rest "silly" estimates of steel needs of the industry, most of them too low, and a few of them too high.

In this connection, the council's figures on the steel needed to obtain completely new production amounting to 300,000 barrels daily from exploration through the petroleum refinery will be of most use. The council's figure for this is 1,745,000 tons of steel, or an average of 5.82 tons of steel a barrel of product. In Canada, the steel cost to do about the same job would be 3.97 tons of steel for a barrel of product, and in Venezuela 2.28 tons of steel. The varying estimates are explained as due to higher production per well abroad and other factors. The Canadian and Venezuelan figures are based on the output of 100,000 barrels daily, but council sources said the same ratio, generally, would prevail if the production figure were higher.

While the figures are based on steel needs

Slag floating on surface of ladle.



Double strand pig iron casting machine. Photos courtesy American Iron and Steel Institute.

to find the first million barrels daily of production, Dr. Wilson explains that they would hold true, generally, of the steel needs to find a second million barrels daily. For the second million, he said, the figure might be higher, since deeper drilling, greater hauling distances and the like might call for more steel.

In making its estimates, the council's committee had to make certain assumptions about where crude production would be developed, where refineries would be located, and whether the transportation would be by pipe line, tank-car or tanker. The council emphasized that these were merely estimates for the purposes of the study, and by no means forecasts of what the petroleum industry actually will or won't do, in tackling the actual task of expansion. The assumptions in brief:

1. Some 500,000 barrels daily to come from existing U. S. reserve producing and refining capacity by laying of pipe lines and building of storage facilities.

2. Some 300,000 barrels daily new production to be developed in District Three, with pipe lines to carry the crude to 12 Gulf Coast refineries.

3. Some 100,000 barrels daily to come from all new production in Alberta, Canada, with four new 25,000-barrel refineries to be built in the Pacific Northwest, and a crude oil line to be laid from Alberta to Vancouver.

4. Some 100,000 barrels daily of all new Venezuelan crude from new wells and new discoveries in Eastern Venezuela, with gathering and trunk lines to carry crude to deep water, and tankers needed to haul the crude to a new 100,000-barrel refinery in the New York area.

Estimated Steel and Capital Requirements for Developing Availability of Million Barrels Daily of Petroleum from Sources Specified by Oil and Gas Division

	500,000 b/d Existing U.S.	300,000 b/d New Dist. III	100,000 b/d New Canada	100,000 b/d New Venezuela	Total
	Total Steel Required, Thousands of Tons				
Exploration and Production	....	1,210[1]	118[2]	55[2]	1,383
Transportation	624	278	190	101[2]	1,193
Refining	....	257[4]	89[2]	72	418
Storage[6]	237	...	..	..	237
Total	861	1,745[1]	397	228	3,231
Average tons per daily barrel	1.72	5.82[1]	3.97[2]	2.28[2]	3.23
	Capital Required, Millions of Dollars				
Exploration and Production	None	—Not available—			
Transportation	202	109	103	71[2]	485
Refining	....	257[4]	98[4]	73	428
Storage[6]	52	...	...	..	52

Notes:

[1] Includes steel used for maintenance of existing wells; does not include credit for natural gas which on the average would be equivalent in heat value to 234,000 b/d of additional oil.

[2] The lower steel requirements per daily barrel for foreign production, especially Venezuela, reflect the difference among various areas, both in the United States and abroad, due to many variable factors, including major differences in the production per well.

[3] Includes pipe line to coast of Venezuela and tankers from there to East Coast.

[4] Based on three 50,000 b/d, four 25,000 b/d, and five 10,000 b/d refineries, all designed to minimum specification for average industry yield of products.

[5] Based on four 25,000 b/d refineries, designed as above.

[6] Covers only the additional storage needed in order to utilize fully on a year-round basis 500,000 b/d of the excess capacity existing in the base period. The storage requirements of new production, transportation, and refining capacity for the last three increments are included with those figures on capital and steel.

Earnings Continue High

Oil company earnings in the United States continued high during the third quarter but the rate of gain was somewhat less than in the first half. A compilation of the earnings reports of 36 companies shows an increase of 29.8 percent in net profit to $1,493,608,000 for the first nine months. First half reports had shown a gain of 43.3 percent. Earnings for the third quarter were 11.5 percent higher than in the corresponding quarter in 1950. Adjustments for higher taxes made much of the difference.

Socony-Vacuum Oil Co. reported an increase of $46 million or 55.5 percent in nine months net. Standard Oil Co. (N. J.) net for the first three quarters was up 47 percent, The Texas Co. and Phillips Petroleum Co. each were up 39 percent, Sinclair Oil Corp. 24.6 percent, Richfield Oil Corp. 22 percent and Houston Oil Co. 21 percent. Reports of 36 companies for the nine months' period follow.

	Net Income (Thousands of Dollars)		Per Share On Common	
	1951	1950	1951	1950
Amerada	(a)$8,204	$7,635	(a)$2.60	$2.42
Anderson-Prichard	3,645	3,848	4.48	4.73
Atlantic Refining	31,988	27,809	8.65	9.82
Barber Oil	1,953	668	5.17	1.77
Bishop Oil	216	114	.63	.33
Cities Serv.	42,005	37,378	10.81	9.61
Continental	31,304	29,600	3.22	3.07
Deep Rock	1,797	2,033	4.50	5.09
Derby Oil	998	806	2.48	2.00
Gulf	93,612	83,200	4.13	3.67
Houston	5,275	4,355	4.80	3.96
Lion	8,305	10,414	3.55	4.45
Maracaibo Oil	461	213	1.03	.47
Ohio Oil	30,950	28,225	4.72	4.30
Phillips	49,751	35,885	3.74	2.96
Pan Am Pet. & Trans.	17,252	15,529	3.65	3.28
Pure	24,375	.....	5.70	...
Quaker State	1,504	2,163	1.62	2.33
Richfield	21,214	15,788	5.30	3.95
Seaboard Oil Co. (Del.)	4,873	3,774	3.98	3.08
Shell	65,736	62,700	2.25	1.75
Sinclair	58,431	46,902	4.83	3.88
Skelly	22,035	19,954	8.43	7.63
Soc.-Vacuum	119,000	83,000	3.74	2.61
Std. (Calif.)	130,460	107,067	4.55	3.73
Std. (Ind.)	105,404	87,334	6.88	5.71
Std. (Ky.)	6,974	8,679	2.68	3.33
Std. (N. J.)	403 000	274,500	6.65	4.53
Std. (Ohio)	15,045	14,615	3.95	3.90
Sunray	18,061	19,001	1.80	...
Texas	132,063	95,133	4.80	3.45
Texas Gulf	2.305	2,152	2.08	1.98
Texas, Pac. C. & O.	5,068	4,334	2.86	2.45
Tide Water	26,771	23,455	4.19	3.62
Venezuelan Pet.	2,955	1,794	.74	.40
Wilcox	618	540	2.20	1.92
Total	$1,493,608	$1,160,597	...	...
Increase	29.8 percent			

(a) 6 months

Synthetics Controversy Flares Again

Interior Department favors large scale development of synthetic fuels, claiming prices now competitive with petroleum, while National Petroleum Council cost estimates are much higher.

THE subject of commercial scale production of petroleum from coal and oil shale is in the forefront again, with the release of two new reports, one from industry and the other from government. The reports are so far apart in their findings and in the facts entering into a decision for or against synthetic petroleum, that there appears little chance of a meeting of minds soon.

The industry report, prepared by the National Petroleum Council, estimates the cost of gasoline from coal hydrogenation would be about 43.5 cents a gallon, or more than three times the present tankwagon price. W. S. S. Rodgers of The Texas Co. was chairman of the council's synthetic study committee.

A report of the Bureau of Mines of the Interior Department, released at the same time as the council's, put the cost at 11 cents a gallon, and added that a 14-cent selling price would cover amortization costs. In other words, the bureau said that gasoline from coal is virtually competitive, pricewise, with gasoline from crude oil.

The petroleum council's report was more favorable to oil shale methods, suggesting further study, and said gasoline from oil shale can now be produced at 14 to 15 cents a gallon. The government's chief interest, however, is in coal as a source, partly because it is located closer to consuming centers and also because it is available at many points. Oil shale sources are largely located in a few areas in the west, far from population centers.

The steel requirements of a coal hydrogenation plant are estimated by both industry and government to be approximately the same

The bureau sees the need of 7 to 7.3 tons of steel for each barrel daily of product, including chemicals, and says this compares with 7.8 tons of steel needed to obtain one barrel daily of gasoline from crude petroleum.

The petroleum council's synthetic report says the steel needed for gasoline from coal hydrogenation would be about 7.9 to 8.5 tons of steel for each barrel daily of production. Another petroleum council committee says the steel needed to produce gasoline from crude petroleum including exploration and development in this hemisphere ranges from about two to nearly six tons of steel per barrel daily of product, depending upon the source of the crude.

The two reports differ in other respects. The bureau said a 3.5 percent return on investment would be adequate, since the assured source of supply wipes out the risk factor. The industry report made its calculations on the basis of a six percent return, but said the speculative nature of the project would require a 15 percent return in order to attract capital.

The bureau defended its cost estimates as sound, but the industry report said they are about 25 percent too low.

While the council report virtually ruled out the coal hydrogenation process, although it had a good word for oil shale processes, it did not discard coal as a source of synthetic petroleum in the future. In fact, the committee plans to continue its study of production of synthetic liquid fuels by gasifying coal and converting the resulting mixture of carbon monoxide and hydrogen to liquid fuels by modification of the Fischer-Tropsch process.

There is not enough information on this process to make accurate cost estimates as yet, the committee explained, but significantly added: "It is noteworthy that estimates made by other investigators on the cost of producing gasoline by this process have indicated that such costs are lower than those obtained in the coal hydrogenation case."

Mr. Rodgers, whose own company has been conducting research along this line, personally appears to have high hopes for the eventual economic success of gasification and subsequent synthesis methods. In his own report to Secretary Chapman, Mr. Rodgers stated of coal gasification: "This work has been undertaken since we are fully aware of the long range planning that must be done to assure our nation a continued supply of hydrocarbons for fuels, lubrication and chemicals. Out of this work by private industry will without a doubt come a process whereby coal can be converted economically and practically to liquid fuels and chemicals, so that when the need arises, the process will be ready to use."

What is ahead regarding synthetic petroleum? First of all, the drive for a gasoline-from-coal project already is underway, both in government and industry. The petroleum, natural gas and coal industries are doing their own research, and one day, when the need arises, will be able to say it is now economically practicable to get petroleum products from synthetic sources. The government already had asked $450,000,000 of Defense Production Act funds to guarantee a private operator in the commercial production of gasoline and chemicals from shale and coal.

Second, any substantial start on commercial-scale production seems some time off. Defense Director Charles E. Wilson has said he has neither the steel nor the money to sponsor an "experimental" venture in synthetic petroleum at this time, and he may be expected to use the petroleum council's report as ammunition, if the pressure becomes heavy.

The petroleum council report, further, will serve as a "go slow" sign to private capital considering embarking upon commercial scale gasoline-from-coal production, although it may not stop the move completely. It is bound to carry more weight with private capital, for instance, than a government report, such as the Bureau of Mines document, which tends to be suspect because it is from government. The council report will carry weight with Congress, which will study the subject next year.

Third, the long run trend sees more and more attention being given coal as a source of petroleum, so that Secretary Chapman, in his letter to Mr. Rodgers, stated: "It is perfectly evident that the time will come when this nation must rely in part on liquid fuels produced from coal or shale. I do not need to prove that point to petroleum industry men because your own leaders have written, spoken and testified eloquently on that subject. We can argue with each other about 'when' and about 'how' but not about 'whether.' We all agree that the time will come."

In an address before the American Petroleum Institute at Chicago, Eugene Holman, president of the Standard Oil Co. (N. J.) suggested that oil from coal and shale is a prospect for the "rather distant future." He stated the belief that research should be continued.

"I believe," Mr. Holman said, "the oil consumer will be best served, however, if the development of synthetics evolves in a normal manner under the influence of straight-forward economics. Schemes for artificially forced growth might actually retard sound long-term development. Normal economic indicators will point to the times for expansion in the synthetics field and will provide the normal incentives to bring that expansion about. Those normal indicators will be responsible for the development of a synthetics program tied in to the overall liquid fuel pattern in the most efficient way. As suppliers of energy, I know we in our company intend to keep on serving our customers from whatever source is best. When the time comes that synthetics seem necessary for this purpose, we will certainly begin making them."

There are many who believe that the Athabasca tar sands in Canada will be a more economical source of petroleum than either coal or oil shales. Vast reserves are available and techniques of recovery and processing are being developed. At the recent tar sands conference at the University of Calgary, Alberta, the continuous coking process under development at a California refinery of Richfield Oil Corp. was suggested as a method which will assist in tar sands processing. A paper on this process is reproduced on the next page.

Continuous Contact Coking For Processing

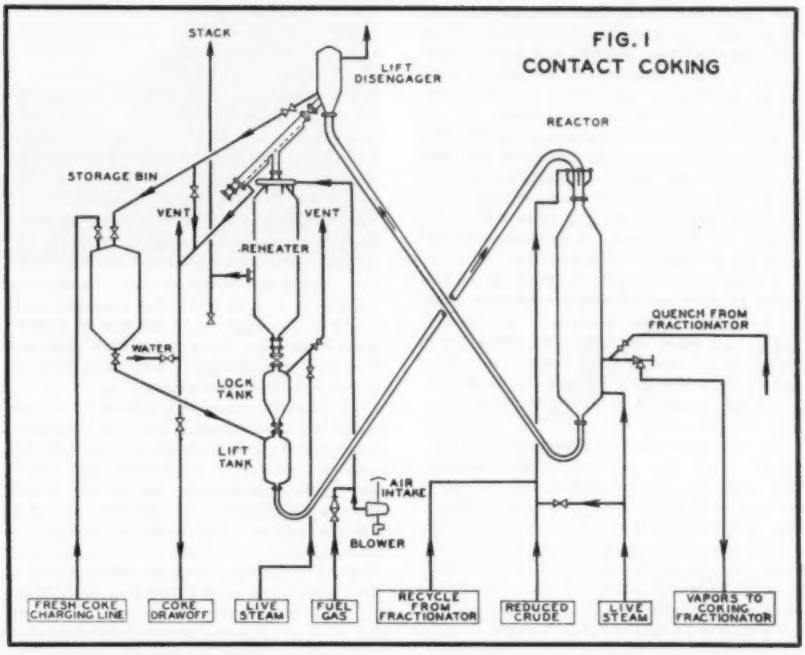


FIG. 1
CONTACT COKING

THE processing of bitumen for recovery of distillate fuels bears great resemblance to the problems of handling shale oil and heavy petroleum pitches and asphalts. Coking has been used for converting such heavy materials to lighter distillates and coke. Along with the removal of the carbon are also removed heavy minerals or metallic compounds which would cause serious troubles in further process steps. To illustrate, coking of heavy petroleum residues removes coke and metals like vanadium, which increases catalyst life in catalytic cracking or other process operations charging this coker distillate.

Coking of bitumen would yield a synthetic crude oil of low carbon and mineral content which would be ready to be refined by conventional methods and further upgraded by such a process as hydrogenation to produce premium distillate fuels.

The discussion here will be limited to the primary coking step. Time did not permit a thorough study of the application of this new coking process (continuous contact coking) to the Alberta Oil Sands Project. This paper is limited, therefore, to a general description of the process and the presentation of some typical data from semi-commercial plant operations. This new process lends itself to operation on extremely heavy materials from a wide range of origins including petroleum pitches, asphalts, naturally occurring bitumens and shale oil. This process has been developed by extensive work through the semi-commercial stage and the next step is large scale operation.

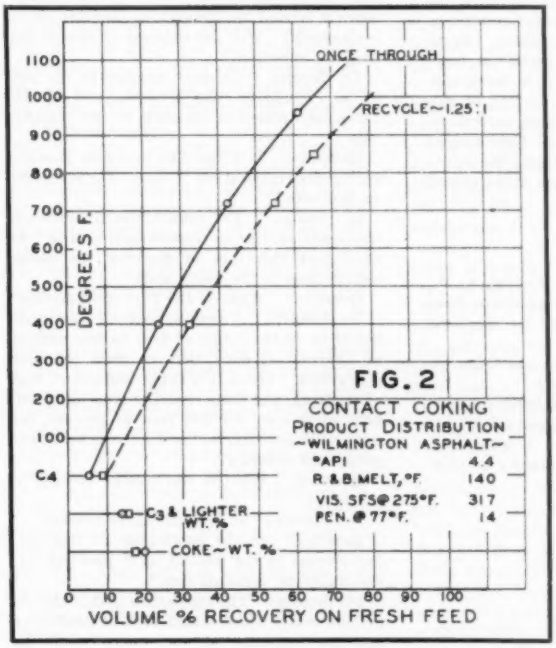
Continuous contact coking has been described in two publications (1, 2). Figure 1 shows a simplified process flow diagram. A continuous stream of coke particles circulates through the reactor vessel and the reheater. This circulation is obtained by means of mass flow lift which elevates the material as a dense phase unagitated column. The power for the lifting is provided by high pressure steam. The charge material is contacted with the reheated circulating coke at its entrance to the reactor in such a way that uniform distribution of the oil on the coke particles is obtained.

At the oil-coke contacting zone, the lighter portions of the feed are vaporized and the heavier unvaporized material is taken up as a liquid film on the coke particles. The wetter coke particles travel down slowly through the coking reactor as a compact bed and are allowed a residence time of approximately 30 minutes to complete the coking and drying reaction. At an intermediate point in the reactor, the product vapors are removed through an internal drawoff device and the coke descends below this vapor disengaging zone into a stripping zone where the final drying out is obtained in an atmosphere of steam. The dried coke particles are then elevated to

(1) A. H. Schutte, *Petroleum Processing*—July, 1949.
(2) A. H. Schutte, *California Oil World*—October, 1949.

Alberta Bitumen

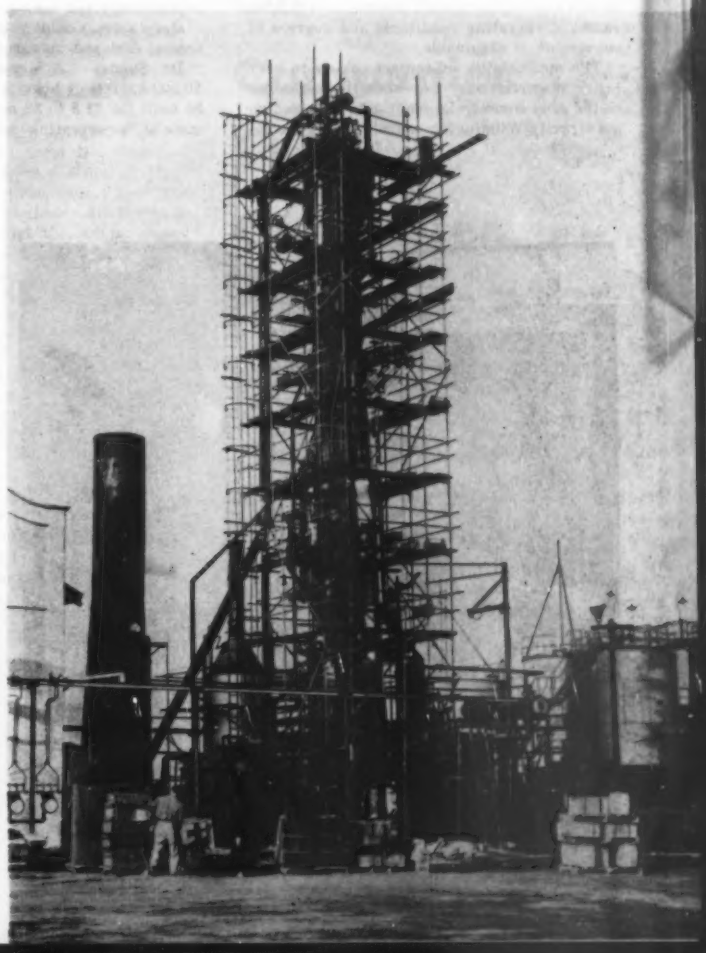
By Dr. E. R. Smoley and A. H. Schutte*



* The Lummus Co., New York. This paper was presented by Dr. Smoley at the recent Athabasca Oil Sands Conference held at the University of Alberta, Edmonton. Proceedings of the conference are being printed and will be available on application to the Board of Trustees, Oil Sands Project, Government of Alberta, Edmonton. Dr. Smoley's paper is reproduced here through the courtesy of K. A. Clark of the Research Council of Alberta, technical manager of the conference.

the spent coke lift disengager from which they flow by gravity into the coke reheater under control of a remote operated valve which determines the coke circulating rate in the entire system. In the reheater, the coke drops on to a free pile subjected to radiation from internal gas burners. Part of the heating is done by this direct radiation and part is done by contact with the flue gases which pass concurrently with the coke through the reheater. From the bottom of the reheater the coke discharges by gravity into the lock tank which forwards it into the high pressure lift tank for recirculation back to the oil contacting zone above the reactor.

As oil is charged to the unit, the successive layers of coke deposited on the circulating material result in a gradual increase in particle size and an increase in the inventory of coke in the system. The larger particles are drawn off through a classifier as a product coke stream to maintain essentially constant inventory in the system. The coke product is in



Pilot plant for the continuous coking process is shown here at the Richfield Oil Corp. refinery, Wilmington, Calif. From the ground, up, it consists of a lift pot section, a re-heating section, a reactor and a coke hopper. It has a 100 b/d charging capacity.

the form of very hard dense pellets of rounded form and low volatile content. The major dimensions of these pellets may range from ½ inch to one inch.

This process eliminates the semi-continuous operation of coking chambers required in conventional methods. It eliminates the labor, operating supervision and utilities involved in removing the coke from the coking chambers. The yields of hydrocarbon products are superior to those obtained by previous processes and the coke product is obtained as a stream of dry, high strength pellets, free of fines. This eliminates handling losses and fines production in the transportation and subsequent processing of the product coke.

Since the heat requirements of the process are obtained from the circulating coke stream, it is unnecessary to heat the bitumen charge above the temperature required for pumpability and convenient handling. Former processes required all the heat to be put into the oil charge stream in a fired heater at temperature levels in excess of 900°F. For this reason the continuous contact process is applicable to charge materials of higher carbon residue and solids content than in the case of the delayed coker.

It was also necessary in the conventional drum type coking operations to maintain the volatile content of the product coke within rather narrow limits in order to permit its easy removal from the drum at the end of the coking cycle. This, in turn, fixed the temperature level of the operation and the degree of conversion obtainable within relatively narrow limits. Since no similar limitation exists in this continuous contact process, a very wide range of operating conditions and degrees of conversion is obtainable.

The applicability of contact coking to very heavy materials may be shown by referring to the semi-commercial plant data obtained on a 4 Gravity Wilmington asphalt of 14 penetration and 150°F ring and ball melting point. Typical yields and product distribution in contact coking of this stock are shown in Figure 2 for once-through and recycling conditions. It should be noted that once-through yields of about 25 percent of C_4 to 400°F were obtained from this material. The research octane number of the debutanized gasoline was 78 to 83 clear and 88 to 92 with 3 cc TEL.

On comparing contact coking results with delayed coking of lighter stocks where both methods are applicable, we find that contact coking produces more gas, more gasoline of a higher octane number, more gas oil and less coke than delayed coking.

The data presented graphically in Figure 2 shows the decrease in end point and increase in light product yield obtainable by recycling heavy material and indicates a high degree of conversion of the recycle component.

The 30 percent water-bitumen would be preheated by exchange and preflashed as integral part of unit to remove most of water. In addition to the applications in petroleum refining, the contact coking process is being considered for handling a wide variety of materials obtained by recovery from natural deposits or as processed residues. Each project requires special study to determine the utility of the new tool and its best place in the overall scheme of operations.

Discussion

Following presentation of the paper, Dr. Smoley answered a number of questions from the floor. These questions and Dr. Smoley's replies are given below:

Question: Could you give something on capital cost and operating cost?

Dr. Smoley: A larger unit handling, say, 10,000 barrels of heavy charge per day should be built for $1.5 to $2 million. A rough estimate of the operating costs of similar units of that size would be as follows: For topping units, 10 to 15 cents per barrel; for thermal cracking units, 25 to 30 cents; for catalytic cracking, 30 to 35 cents; and for coking, 35 to 50 cents.

Question: Was the capital cost figure within battery limits?

Dr. Smoley: That was within battery limits.

Question: Does the 35 to 50-cent estimate for coking represent the direct operating cost, or does it also include amortization?

Dr. Smoley: It was given as a direct operating cost.

Question: What would be the effect of a build-up of mineral matter in the wet oil?

Dr. Smoley: We would expect it to be included in the progressive layers laid down on the coke particles and thus to appear as ash in the coke product. The ash content of the coke of say ten percent may be an advantage when it is used for domestic or industrial fuel.

Question: Will the increase in size of the balls be important?

Dr. Smoley: Gradual increase in the size of the circulating coke is normal and classification equipment is included in the installation.

Question: In a unit like this, how does the sulfur distribute itself? Does it concentrate in the coke?

Dr. Smoley: The coke sulfur distribution was quite similar to conventional coking. In processing this type of material the sulfur usually goes to the heavy ends.

Question: What is the fuel consumption?

Dr. Smoley: A very approximate estimate would be in the range of four to five percent of charge. It runs that in most cracking operations. There is a slight amount of heat of cracking, and some recovery from the products going out. In this type of process, the coke could probably be used as such on power generation schemes.

Question: What is the volatile content of the coke?

Dr. Smoley: It is about three percent.

Question: In the application of this coking process to the wet oil, is it planned that the water be removed first?

Dr. Smoley: The conjecture is that this 30 percent water stock would first be heated up and the majority of the water would be flashed off. A second flashing would remove the lighter gas oils before the oil was charged to the coke reactor.

Question: One point of great concern is the form of preheater in front of the coke reactor—whether it has any tubes in it or not?

Dr. Smoley: This four percent sulfur and two percent minerals does bother a bit on pumping through a tubular heater, but it can be worked out satisfactorily at the low preheat temperatures required.

Question: What size pilot plant was used?

Dr. Smoley: It is a 100 barrel per day unit.

Question: You have operated a smaller one have you not?

Dr. Smoley: Yes. The history of the development of this process started with a small one in the laboratory. It is described in the first reference. From there it went to a 50 b/d improvized unit in Ohio. From it the unit was built from which these data have been quoted. It is in the Richfield refinery at Wilmington, Calif. In that operation, the practicability of running was well established.

Finished product is shown here by Wally Neumaier of the Richfield refinery. The hard coke pellets are virtually dustless.

General view of new $2 million oil and grease plant built at Montreal by Canadian Oil Companies, Ltd.

Canadian Oil Companies Ltd. Completes Modern Compounding Plant

As part of its $22 million expansion program, Canadian Oil Companies Ltd. recently completed an oil and grease compounding and packaging plant at Montreal. Construction work which occupied more than a year was completed on October 24.

The new $2 million plant is located on a 13-acre tract on the St. Lawrence river, with the result that it is accessible to all forms of transportation by land or water. Truck loading docks are located on one side of the plant. Railroad box cars are loaded directly from the warehouse at the other side, and tank cars are filled from adjacent loading spots.

The Montreal plant is a five-way operation, with a canning line, a steel barrel reconditioning plant and a pilot plant built into the three-story brick structure housing the separate oil and grease departments.

The oil plant includes Canada's first oil homogenizer for permanent blending of the ingredients of automotive, aircraft or industrial oils. The building holds the country's first grease colloid mill, one of the few in the world, to pre-work and break-in greases for their varying special jobs. Its oil canning line is Canada's speediest and can fill and package 18,000 quarts of motor oil alone in an hour.

The pilot plant, a miniature of the grease manufacturing setup, enables manufacturing methods for different greases to be worked out from laboratory formulas before full-scale manufacturing begins in the main plant.

A continuous flow of products and packages through the plant was worked out by The Fluor Corp., designers and builders of the installation, so that a minimum of labor is required in handling, processing, packaging, storing and shipping the multiplicity of products. More than 300 varieties of oils and greases are handled, manufactured and blended. Packages range in size from three ounces to 55 gallons.

The specialty canning line, a battery of machines synchronized as a unit, is a typical cross-section of the highly mechanized works as a whole. At the start of the line, cartons of cans from storage are lifted from their conveyor to the unscrambler, which shunts the cans to the high-speed fillers. The endless belt then carries them to the automatic closer, which hermetically seals each can of motor oil. The cans continue via conveyor and elevator to the packers, thence onto another conveyor to the automatic sealer and compression unit, where the cartons are sealed and stamped with the correct S.A.E. number. Conveyors go to work again and deliver the cartons to storage, ready for shipment as needed.

Five-gallon pails pass through a different type of filling operation. Overhead conveyors ferry the pails to a high-speed multiple filler, then by similar stages to end-of-the-line lift trucks, which move them to storage.

All motor oils and many industrial lubricants are put together in an automatic assembly of machines. A proportionating cabinet accurately measures with minute exactness many base materials which go to make up the White Rose formulas. These exactly proportioned ingredients pass to a heater, then through a filter and to the homogenizer to form oils of controlled stability and uniformity. This process is carried out under a vacuum, so that every trace of air and moisture is removed.

One of the banes of the grease-making industry has been the tendency of most greases to thin or lose consistency under the violent action of the bearings they are meant to lubricate. Canada's first grease colloid mill eliminates this in-use problem for Canadian Oil. The colloid mill "pre-works" the grease and breaks it in, so that each grease is fully conditioned and tempered for the job for which it has been designed. After compounding and mixing, and before being placed in containers, White Rose greases are pumped at high speed through close-set spinning discs. The mill also has a device to free the grease of trapped air bubbles, which detract from performance. In containers ranging from five-pound pails to 400-pound drums, the grease is lift-trucked to storage or shipping departments.

To minimize the amount of steel required for shipping containers from the Canadian Oil, Ltd., plant, a drum reconditioning plant has been installed which includes a new type rotary dent-removing machine. Another machine strips and buffs off the old paint and washes and rinses the outsides of the barrels, while other units mechanically remove interior scale or other foreign matter, wash, rinse and vacuum-dry the interior. Cleaned drums are leak-tested and "leakers" are diverted to the drum welder for repair. After spray-painting, the drums are passed through an infra-red paint-drying tunnel on an automatic conveyor.

The entire oil and grease factories are in fact mazes of conveyors and chutes, shuttling empty containers to storage rooms, then through filling lines to shipping platforms, and trundling incoming drums from department to department until they emerge, renovated and refilled. Drums for overhaul from the stockpile outside in the shadow of the tank farm, empty five-gallon motor oil cans en route from the box-car platform, and new quart cans in cartons from the motor transport platform may be wheeling on automatic belts or rollers through the building at the same time as other conveyors feed big and small containers step by step through the canning and filling lines.

Both first and last steps in the production of each of the many types of oils and greases are in the plant laboratory. There the prescriptions are prepared, and there samples of finished products are checked before they are loaded for shipment by rail, water or highway

American Enterprise in a World Setting

By Richard Finnie

IT is a truism among members of the oil fraternity that a major part of the world's petroleum, wherever it may be located, has been brought into production by Americans. This is perhaps not surprising in view of the fact that the industry had its start as a commercial undertaking in the United States and that this country still provides more than half of the entire global supply of oil. The rapid spread of demand for petroleum and the discovery of more and more uses for its products provided incentive for the adoption of new techniques and the constant improvement of its first crude mechanisms.

Petroleum is a conspicuous example of the workings of American enterprise but it is by no means the only one. The pioneers of American industry and their successors down to the present time have faced challenging tasks. To subdue a continent, to harness its vast and varied sources of energy, to gird it with a network of transportation and communication and to supply the needs of a swiftly growing population—all these required hard work and imagination. A task so great had to be carried out on a grand scale. It called for the evolution of new methods, the development of mechanical means to multiply the muscles of human labor and the exercise of inventive genius to devise means of accomplishing ends long deemed impossible.

Through skill and experience gained in meeting and overcoming obstacles, Americans learned how to organize and handle big jobs with speed and efficiency. The knowledge thus won they have carried far beyond the borders of their own land. Monuments to their ability have been erected in many countries in the form of giant dams and power plants, industrial communities carved from the wilderness, and many other engineering works of outstanding significance.

One factor not to be overlooked in this achievement is that it has been the outgrowth of individual effort and initiative. The ability and capital required for successive steps in industrial progress have been supplied by men working alone or in voluntary association. They have assumed the risks and have borne the costs of failure as well as sharing to an extent in the rewards of success. The spirit of free enterprise that has pervaded the evolution of what has come to be called the American way of life has been responsible to a great extent for the results attained and in fact for its very existence.

Typical of American enterprise in action which has extended its operations far afield is the record of a company launched just half a century ago as a local undertaking and which has since spread half way round the globe, embracing activities far removed from those originally contemplated. W. A. Bechtel Company was established at the turn of the century as an engineering and construction firm. From its modest local beginnings it went on to larger undertakings in a broader field. In conjunction with associates and affiliates it carried out diverse large construction projects in various parts of the United States, in Mex-

Richard Finnie, author of this article, has covered with camera and notebook the entire Middle East area where his company has been active as a builder. Shaded areas on the map show location of the principal projects. Bechtel interests laid the eastern portion of Tapline and are now working on the new Iraq Petroleum Co. pipe line from Kirkuk to Banias which is shown as a dotted line in the upper part of the map. Except as otherwise noted, all photographs with this article are by Mr. Finnie.

ico, in Venezuela, in the islands of the Pacific, in Canada, Alaska and in the Middle East. Among them were huge power installations, the building of pipe lines over difficult and forbidding terrain, harbor works and other tasks that contributed to the experience and reputation of the organization.

As an example of distinctively American ability to handle enterprises demanding broad planning, efficient organization and the ability to cope with new and unexpected problems as they arise, one of the outstanding Bechtel achievements has been the work carried on in the Middle East during the past several years which has covered a wide range of engineering and construction under unusual conditions. Two Bechtel organizations have participated in these operations. One is Arabian Bechtel Company, operating in Syria and Iraq. The other is International Bechtel Inc., which has been active in Saudi Arabia, Bahrein and Kuwait. Both are wholly Bechtel-owned and managed, but Bechtel International Inc. for several years prior to 1950 was an association comprising Bechtel interests in San Francisco; R. A. Conyers, Oakland, California; Morrison-Knudsen Company, Inc., Boise, Idaho; Pomeroy Brothers, San Francisco; H. C. Price Co., Bartlesville, Oklahoma; and Sverdrup & Parcel, Inc., St. Louis, Missouri. S. D. Bechtel is chairman of the board, and Van W. Rosendahl is president of International Bechtel, Inc., as well as of Bechtel International Corporation. The latter is an allied but separate engineering and service organization with headquarters in San Francisco. Mr. Rosendahl is chairman of Arabian Bechtel Company and John M. Rogers is president of that company.

It was in 1943 that the Bahrein Petroleum Co. Ltd. (Bapco), called in the Bechtel interests to carry out an aviation gasoline refinery project requested by the United States government. The following year the company began the first of a long series of contracts in nearby Saudi Arabia for the Arabian American Oil Co. (Aramco), entailing construction of a refinery and appurtenances. This led to public-works contracts with the Saudi Arabian government. In 1947 extensive programs were initiated for the two other clients: Trans-Arabian Pipe Line Co. (Tapline) and the Kuwait Oil Co. Ltd. In 1950, work began on a great pipe line project for the Iraq Petroleum Co. Ltd.

Van W. Rosendahl, president of International Bechtel, Inc. and Bechtel International Corp., and chairman of Arabian Bechtel.

S. D. Bechtel, chairman of International Bechtel, Inc., and of the allied engineering and service organization, Bechtel International Corp.

The various operations have extended across the Arabian peninsula from the Persian Gulf to the Red Sea, from Bahrein northwesterly to Kuwait and the Saudi Arabian-Hashemite Jordan border, and across Iraq and Syria to the Mediterranean. Projects undertaken have included refineries, gathering centers, pipe lines, power stations, piers and harbor works, airports, highways and railroads, office buildings, hospitals, shops and warehouses, dwellings and various public utilities.

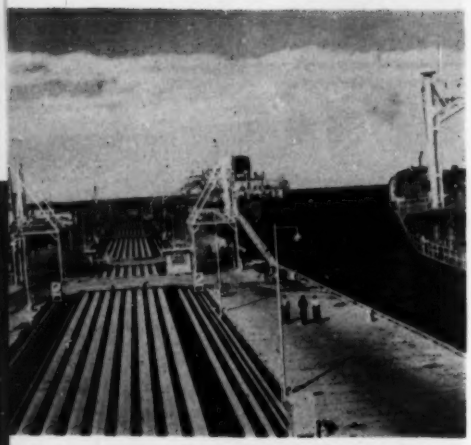
From the outset, the fact had to be taken into consideration that no local sources of foodstuffs or supplies could be counted on. Nearly everything needed had to be shipped from the United States halfway around the world. This meant that most of the planning and purchasing for every Arabian project had to be done at least six months in advance of field requirements.

The climate and terrain of Arabia necessitated the designing of special equipment. Summer temperatures rise to 120 degrees and in winter, frost occurs in some inland localities. Prolonged dry periods are punctuated by heavy rains. Fresh water is scarce and desert wells are usually brackish. Particular attention had to be given to refrigeration, air-conditioning, water supply, insect control, sanitation and transportation.

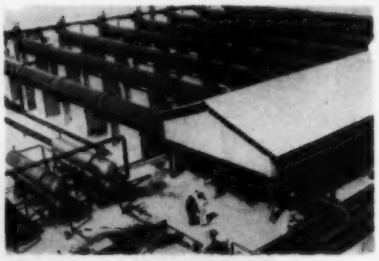
Manpower was available locally, but skilled labor was almost entirely lacking at first. This necessitated the recruiting in the United States of hundreds of competent craftsmen who were willing to separate themselves from their families and familiar surroundings for employment contract periods of 18 months. When work began in Bahrein it was wartime and plane space was at a premium, so workers had to be sent over by ship; nowadays all of them are flown to the several jobsites. As a matter of policy, as many Arabs as possible are employed through local contractors, and as a result of intensive on-the-job training they are gradually replacing Americans in a wide variety of skilled and semi-skilled occupations. A ratio of one American to more than four Arabs has already been attained. This is remarkable in view of the fact that within the past decade most of the Arabs now employed on construction projects were living almost exactly as their ancestors lived a thousand years ago.

Supporting S. D. Bechtel and Van W. Rosendahl in the field have been a handful of key officers whose painstaking efforts, together

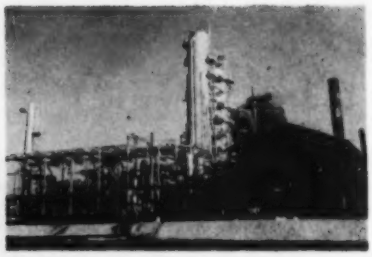
Pier at the Red Sea port, Jidda, built by International Bechtel for the Saudi Arabian government.



Tankers loading at the Kuwait pier-head. Since the Iranian shut-down, loading facilities for Kuwait crude have been operated at capacities up to 700,000 b/d. Fox photo.



Separators at a Middle East crude gathering center. These were designed by Anglo-Iranian Oil Co. and installed by International Bechtel.



Atmospheric crude unit completed for Bahrein Petroleum Co., in September, 1950 The unit, of a rated capacity of 50,000 b/d, has been handling 72,000 b/d.

with the concerted help of scores of supervisors and hundreds of craftsmen, have brought all projects undertaken to a successful conclusion. Among these vice presidents, most of whom have spent a number of years in the Middle East, are J. Roy McAuliffe, who was in Bahrein in 1944-45 and in Saudi Arabia in 1949-51; John M. Rogers, who pioneered in Saudi Arabia in 1944 and was Bechtel's chief representative there until 1950; Earl F. English, who was responsible for the over-all planning for the Saudi Arabian government public-works program; C. S. Snodgrass, who acted as coordinator for two years; George S. Colley, Jr., who managed Bechtel's part of the Trans-Arabian pipe line system and later became senior Bechtel officer in the Middle East; Clark Rankin, who headed the combination of projects in Kuwait and is now building a great pipe line across Iraq and Syria; L. J. Killian, who has handled Bechtel's varied work for the Arabian American Oil Co. since 1944; E. W. Davis, who pioneered in Arabia with Rogers and Killian; D. L. Roberts, who was Bechtel's principal planner for Tapline; and G. E. Walling and R. D. Grammater, who have dealt with fiscal matters relating to all the projects.

The initial contracts for work on Bahrein Island were started in the fall of 1943 and were essentially war projects. All of the difficulties attendant on war projects at that time were present, such as skilled labor shortage, excessive turnover and delays in the arrival of equipment. These difficulties were aggravated by the vast distance from supply sources. One shipload of vital equipment was lost by enemy action. Nevertheless, the work was completed within 19 months and embraced a score of refinery items, including crude distillation and re-run units, gas recovery, aviation acid treating, butane isomerization, central caustic dissolving, sulfuric acid alkylation, steam and electric power, lead sulphide treating, catalytic cracking and so forth. There were also utilities, a drum plant, welding and machine shops and housing.

In 1945-46, Bechtel associates constructed a three-mile causeway and a 1,700-foot loading pier with a 110 x 1,000-foot T-head. This berths four ships at a time. Nowadays, between 60 and 70 vessels use the pier monthly. Bulk exports of petroleum are around 4,300,000 barrels per month, loading at rates of up to 14,000 barrels an hour, plus some 35,000 drums of refined oils and 25,000 drums of asphalt.

Between 1947 and 1951, Bechtel constructed for Bapco an asphalt manufacturing and packaging plant, an additional thermal reformer unit, a reformed gasoline lead sulphide sweetening plant, and a new atmospheric crude unit with a rated capacity of 50,000 barrels per day, besides various facilities and improvements.

In 1937 Bapco's first small refinery was processing 25,000 barrels per day. The present installation processes 155,000 barrels of crude daily, and Bapco officials believe that it is one of the most efficiently operated refineries in the world.

Bahrein's oilfield supplies only 30,000 barrels per day, the balance coming through a 34-mile pipe line from Saudi Arabia. This line, 12 inches in diameter, was laid in 1945. The under-water span, Somastic-coated, is 17 miles long. In 1947-48 it was looped at either shore to obtain greater capacity.

At Ras Tanura, Saudi Arabia, where the Bechtel interests began work for Aramco in 1944, a 3,000-barrel plant was replaced by a refinery with a rated capacity of 50,000 barrels daily. Originally built as a defense project between 1944 and 1945, it was subsequently enlarged to process 115,000 barrels per day; but to meet an ever increasing demand it is now turning out 160,000 barrels per day of gasoline, diesel fuel, kerosine and fuel oil.

Covering more than a thousand acres, with supplementary facilities, the Ras Tanura refinery is Aramco's most complex single installation and represents an investment of more than $70,000,000. During the past several years its capacity has been stepped up by increasing its pumps in size and number, rerouting oil lines to use heat more efficiently, and increasing the capacity of the fractionating towers.

Along with the original refinery work, the Bechtel interests constructed an oil-loading and cargo pier at Ras Tanura comparable in size to the one at Bahrein, and at the same time laid flow lines around a stabilizer erected at Dhahran. Additions were later made to the stabilizer, which now processes more than 125,000 barrels per day of crude from the Dammam and Abqaiq fields. An electric power plant was built at Ras Tanura and a 40-mile high-tension line was run to Dhahran to supply the whole community.

In 1947 a housing program for Aramco was launched at Dhahran, and whole new residential areas were created with both permanent and portable dwellings. That year a large modern office building was started for Aramco and an up-to-date hospital for the Saudi Arabian government.

In 1948, at the great producing center of Abqaiq, 40 miles away, a trap setting designed for the processing of more than 100,000 barrels of crude a day was built, and between Qatif and Ras Tanura, 17 miles, the first fully restrained above-ground pipe line in the Middle East, 20 and 22 inches in diameter, was laid.

That year also, a new pier was started at Ras Tanura. Completed in 18 months, its approach trestle is 3,750 feet long, and its head, making a reversed "L," is 600 feet long, equipped with loading lines for crude oil and bunker fuel. The older pier is 2,400 feet long with a 900-foot "T" head.

From 1949 to the present time Bechtel's work for Aramco has continued steadily at Ras Tanura, Dhahran, Abqaiq, and the recently developed fields of Ain Dar and Buqqa, comprising new gathering centers, flow lines, housing, warehouses and shops. The value of all the projects carried out by Bechtel for Aramco since 1944 totals somewhere around $200,000,000. Aramco's petroleum production is currently in excess of 800,000 barrels per day.

Not relating directly to petroleum development, but undertaken under Aramco's aegis, was the railroad and pier project carried out by Bechtel between 1948 and 1950. Running to the capital city of Riyadh from the Persian Gulf at Dammam, near Dhahran, a distance of 350 miles, is the first railroad to be operated in Saudi Arabia since T. E. Lawrence's Arab troops blasted the Hejaz line to Medina because of its use by the Turks in World War I. The new railroad, earnestly desired by King ibn Saud, was begun by Bechtel forces in 1948. They completed 111 miles of track from Dammam to Hofuf in 1949. The balance has been built under direct Aramco supervision, reaching Riyadh at the end of 1951. The Dammam port has been done entirely by Bechtel. It consists of a five-mile rock-fill causeway, extending beyond which into deep water is a two-mile steel pile trestle. On the wharf proper, 84 feet wide and 744 feet long, is a 70-foot-high cargo tower superstructure

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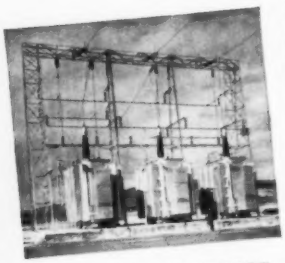

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Preparing for a tie-in during construction of the Trans-Arabian pipe line.

whereby ships may unload freight from their holds right into cars waiting on any of five ladder tracks.

Along with its varied oil company work the Bechtel organization has carried on extensive construction through direct contacts with the Saudi Arabian government. These projects, all financed by oil royalties, have been part of a long-range public works program initiated by King ibn Saud. Starting in 1946, Bechtel men spent five years on a combination of projects in three widely separated areas from the Persian Gulf to the Red Sea, in and around Dhahran, Riyadh and Jidda, building power stations, transmission lines, harbor works and piers for ocean-going vessels, airports, roads and railroads, public buildings, hotels, offices, hospitals, residences, shops and warehouses, water-supply and sewerage systems. Each of these undertakings has been put through by technical staffs of only a hundred or so Americans who have trained and supervised Arab forces averaging a thousand. The Saudi Arabian public-works program anticipated the much discussed Point 4 plan of the United States by several years.

Greatest of all single projects constructed by the Bechtel interests in Saudi Arabia was their part of the $230,000,000 Trans-Arabian Pipe Line system conveying more than 300,000 barrels per day of crude oil from Aramco's Abqaiq field near the Persian Gulf to Sidon, Lebanon, on the Mediterranean, 1,068 miles to the northwest. Under contract with Trans-Arabian Pipe Line Co., they were responsible for four of the six pump stations and all of the pipe line system within Saudi Arabia, totalling 854 miles.

Active planning for Tapline started in San Francisco in March, 1947. Purchasing began early the following month, and on June 19 the first contingent of men left for Arabia to meet the first consignment of supplies for the project. By December, 1947, the planning had been finished and 90 percent of the requirements for the job had been shipped or were at dockside awaiting shipment, apart from the pipe, which was being scheduled according to steel allotments, and pumping station materials, which were to be shipped according to construction schedules. There were more than 7,000 separate purchase items exclusive of spare parts, and these numbered over 30,000 different kinds.

At an uninhabited point at the northeastern corner of Saudi Arabia a miniature modern city called Ras el Misha'ab was created in six months, with its own power supply, water and sewerage systems, and accommodations for 500 Americans and 1,500 Arabs. This was the main depot and unloading point for equipment and supplies for the easterly two-thirds of the pipe line. The Persian Gulf along this part of the coast is too shallow for ships to approach closer to shore than two and a half miles, so two rock-fill piers were built for berthing lightering barges at high and low tide; and a "Skyhook" overhead cableway (a device adapted from lumbering operations in the United States' northwest) three miles in length was set up for handling a thousand tons of pipe per day directly from ship to shore.

At Ras el Misha'ab a plant was laid out to handle a prospective total of 230,000 tons of pipe. The 30- and 31-inch joints, 31 feet in length, arrived with the smaller inserted in the larger to conserve shipping space. The pipe was denested, then fed to four automatic welding machines, the first ever used for a field operation, which triple-jointed it into 93-foot sections. These sections were carried to the right-of-way, as many as ten to a load, weighing up to 40 tons, on trailers hauled by 295-horsepower Kenworth trucks.

Trails were blazed across the desert, and by the beginning of January, 1948, the first of a series of line camps had been established and clearing of right-of-way was being done. The first increment of the Trans-Arabian system, between Abqaiq and Qatif, was completed in May of that year.

Twenty of the Abqaiq-Qatif line's 44 miles were buried. The remaining portions were mounted above ground on concrete pads or on pile bents, the pipe being restrained by ring girders, with anchors placed wherever there was a change in direction of one degree or more. This above-ground construction was indicated wherever hard rock made trenching costly, or where moist salt flats presented conditions that would cause corrosion of a buried line. The salt flats were encountered only in the first hundred miles of the route, and no more pile-driving was required beyond. Thereafter, above-ground portions of the line, which amounted to 40 percent of the total, were confined to particularly rocky areas and were mounted in ring girders on concrete piers.

In sandy or gravelly stretches, where the line was to be buried, a ditching machine inched along a mile a day, making a cut four feet wide and five feet deep. Here and there were strata of limestone which called for other equipment. The most spectacular was a giant ripper weighing 20 tons and pulled by four big tractors. The ripper was useful, but its effectiveness was often limited by the tendency of its six-foot steel tooth to drift from side to side. Dynamite was brought to bear where the rock was really tough. All told, more than two and a half million cubic yards of material had to be moved.

Conventional pipe laying methods were used, and the lining up was done with an automatic electrically driven internal clamp. Above-ground sections were untreated except in some areas where encroaching sand dunes might cause corrosion. Below-ground sections, after being cleaned and primed, were coated with hot asphalt, wrapped in glass fiber, then coated again, and finally wrapped in kraft or felt paper.

Day after day the big pipe trucks rolled out of the base camp and headed for the right-of-way. Along with the pipe went convoy after convoy of all manner of equipment, building materials, fuel and foodstuffs. Truck-trailer combinations carried the tonnage of freight trains. The freight hauled overland for Tapline grew to a total of 150 million ton-miles.

Men and machines forged ahead, building and maintaining roads that would stand up under constant heavy traffic. More than twelve hundred miles of main-line desert highway and access roads were built, not only serving the immediate needs of construction and operation, but also opening up a throughway for commercial motor traffic for the first time across Saudi Arabia between the Persian Gulf and the Mediterranean.

It was a heavy task just to keep in repair the low-pressure tires used on all the trucks, trailers and graders. There were the giant 50-ton truck-tractor combinations for pipe-hauling, and hundreds of other vehicles of various types besides all the earthmoving machinery. Altogether about $18,000,000 worth of equipment was used in building the line. Staffs of mechanics and machinists were kept busy around the clock at Ras el Misha'ab and outlying camps.

New camps were set up at convenient intervals for the construction crews. Buildings were so constructed that they could either be dismantled or picked up bodily and carted from place to place as needed. Each camp had its own self-contained plumbing system. Each had a well-run messhall. Besides canned

Pouring concrete footing for one of the engines at a desert pump station at Qusiumah on Tapline.

Work of laying the new Iraq Petroleum Company's "big inch" line to the Mediterranean coast is proceeding at a rapid pace. Fox photo.

Complete port facilities including machine shops and living quarters for a large staff were erected at Ras el Misha'ab by International Bechtel before it was possible to lay Tapline.

Arabs have been trained to do many technical jobs in connection with construction projects. This Arab is reconditioning a large truck engine used for desert hauling.

goods there were frozen fresh fruits, vegetables, meats and even whole milk, all shipped in refrigerator boxes from the other side of the globe.

To all of the men on the job and to all of the wayfarers in this arid land one commodity was of far greater immediate value than oil; that, of course, was water. Fifty-two wells were drilled at strategic locations and forty of them proved productive. A new water supply was thus created not only for pump stations but also for the Bedouins and their livestock. The watering places became permanent public utilities, making life easier for man and beast in a harsh environment.

In the spring of 1949, construction was started on the first of four big pump stations assigned by Tapline to International Bechtel, Inc. Averaging 170 miles apart along the right-of-way, all within Saudi Arabia, the units were equipped with centrifugal pumps driven by steam turbines or super-charged diesel engines through speed increasers. Generator units at each station comprised three 800 kw., 2,300-volt 60-cycle generators driven by 1,320 hp diesel engines. Booster pumps were verticals driven by 400 hp electric motors or single-stage horizontals driven by 200 hp electric motors. Each station was provided with family and bachelor housing, and facilities included air-conditioning and refrigeration plants, recreation halls, infirmaries, dining rooms, tennis courts, baseball fields, movies, radio programs and playgrounds. Airports were laid out and are used daily by Aramco DC-3's carrying mail, freight and passengers.

In the tremendous program of transportation and construction, Arabs outnumbered Americans by as many as fourteen to one. At the peak of activity, more than 14,000 natives were employed on the Tapline project. Most were engaged through Arab subcontractors who themselves had been set up in business by Aramco or Tapline. The Arabs, reared in an atmosphere that has changed little in a thousand years, proved surprisingly adaptable. With Americans as teachers, they not only learned to do unaccustomed tasks but also bridged the gaps of culture and language.

By the fall of 1950 all of the pump stations were in the final stages of cleanup and testing. Oil was already coursing through the completed portion of the line. Just to fill the Tapline system, including the tankage and the line itself, required six million barrels of oil, half of the entire world's production for a day. Construction which had begun in 1947 was completed before the end of 1950, and this period included a full year during which work was on the verge of suspension because official licenses for essential materials were temporarily withdrawn. On December 2, 1950, the first oil from the Saudi Arabian fields to reach the Mediterranean via Tapline was pumped through submarine lines into a tanker standing offshore at Sidon, Lebanon, 35 miles south of Beirut. The initial output of the line was 300,000 barrels per day, but by looping part of it, or with an extra half-dozen pump stations, its capacity could be increased to a half-million barrels.

In the early days of Tapline, International Bechtel contracted with the Kuwait Oil Co. Ltd. for the performance of an ambitious construction program in the Shaikhdom of Kuwait. At the head of the Persian Gulf, just above the Neutral Zone bordering the northeasterly corner of Saudi Arabia, Kuwait is a 6,000-square-mile desert country which yielded oil for the first time in 1938. Because of war conditions, production did not get under way until 1946. The following year, petroleum shipments were being made at a rate of 100,000 barrels per day, and petroleum geologists estimated that here was one of the greatest single oil fields in the world.

IBI's assignment was to help develop the field further and create additional outlets. Planning began in San Francisco in July, 1947, and the vanguard of the supervisory staff arrived in Kuwait in the fall. The work was spread out between the four principal centers as far apart as thirty miles. There was freight to be unloaded, there were pipe lines to be laid, a large assortment of machinery to be installed and a pier and boat harbor to be built.

A semi-permanent camp was set up at Mena al Ahmadi for a force of 450 Americans, besides a smaller camp at Shuwaikh. Problems of food and water, even more acute than those in Saudi Arabia, had to be solved. All of Kuwait's water wells were brackish, and fresh water had to be brought by tanker from the Shatt al Arab, below the confluence of the Tigris and Euphrates.

At Shuwaikh, with four cranes on a small pier, cargo lightered from ships at anchor was unloaded at a rate of 1,500 tons a day. Dolphins and a walkway for mooring fresh-water tankers were constructed, barges were assembled, and a camp and pipe double-jointing plant were established there. At the capital city of Kuwait a 600-foot timber-decked jetty of pipe piling was built.

At Ahmadi, the oil company's principal center, an oxygen plant, ice plant and a laundry were put up, and at Burgan, the oil field, IBI men installed the machinery for a shale grinding mill, machinery for five pump stations and gathering centers, connections for vertical and horizontal separating units, headers, manifolding and appurtenant piping. They also undertook all connecting and flow-line work, comprising some 600 miles of pipe of various diameters from four to thirty inches.

A submarine loading-line operation was carried out in the spring of 1948, with three sets of two lines, twelve and three-quarter inches in diameter, launched by a tanker steaming seaward. The lines, each a mile long, were welded, cleaned, primed, coated and wrapped on shore before placement.

The main project, however, was the construction of the jetty at Mena al Ahmadi, the greatest oil-loading and cargo pier in the world. Starting from scratch in mid-1948, IBI forces cut and padded a 17-mile road to a quarry in the Burgan hills, then proceeded to make a small boat harbor consisting of two breakwaters taking over a hundred thousand yards of fill, while out of the harbor area they dredged 200,000 cubic yards of muck. The small boat harbor was an adjunct to the pier proper. The entire installation was complete and operating by December 1949.

The approach pier is 49 feet six inches wide, including the pipeway and 24-foot roadway, and 4,140 feet in length. From its head the cargo pier branches off to the right and the oil pier to the left. The oil pier is 105 feet wide and 2,805 feet long. The cargo pier is 100 feet wide and 1,077 feet long.

In the entire structure are 3,851 piles. These are 14-inch H-beams weighing 73 pounds per foot and averaging ninety feet in length, coated with hot coal-tar enamel before placement. There are more than two million board feet of lumber in the decking alone, and another million in fenders, curbs, railings and so forth. Every piece of steel was sandblasted, coated or painted; every piece of lumber was given preservative treatment.

The superstructure contains two large office buildings, a compressor and storage building, several fire-protection pump stations, six double stiffleg hose-handling derricks, four six-ton portal cranes and a 60-ton stiffleg derrick.

On the pipeway, which parallels the approach trestle, there are eight 24-inch crude-oil lines, one 16-inch line for bunker oil, and one 12-inch diesel-fuel line. Besides these are many smaller lines, carrying fresh water, salt water, and compressed air. All of this piping makes it possible to load tankers with crude oil and supply them with fuel and fresh water, take fresh water from water tankers, supply sea water to a small refinery on shore near by and provide fire protection.

The Kuwait pier, the largest structure of its kind ever built, can berth simultaneously two ocean-going freighters and six tankers, and its oil-loading capacity is 900,000 barrels per day.

As in Bahrein and Saudi Arabia, IBI's work in Kuwait utilized local labor to the fullest extent. At the peak of activity nearly two thousand Arabs and Indians were regularly employed.

From the great petroleum field of Kirkuk in northeastern Iraq to an outlet on the Syrian coast of the Mediterranean a large-diameter pipe line of international importance comparable to that of Tapline is now being laid by Arabian Bechtel Co. for Iraq Petroleum Co., Ltd. and is scheduled for completion in 1952 at a cost of about $70,000,000.

The line is 556 miles in length. The first 466 miles from Kirkuk are 30- and 32-inches in diameter, the 90-mile balance being 26-inches, with a daily throughput of 275,000 barrels of crude to add to the oil supply of western Europe.

The Kirkuk field was discovered in 1927, and seven years later IPC completed the first pipe lines from there to the Mediterranean. Twelve inches in diameter, they forked near Haditha at the Euphrates, one branch terminating at Tripoli, the other (not now in use) at Haifa. The new line will parallel the original one to Haditha, thence following the Tripoli branch to a point about a hundred miles from the coast, where it will diverge to Banias, farther north.

The base camp is at Homs, Syria, 60 miles north of Tripoli. The 30- and 32-inch pipe was fabricated in California by Consolidated Western Steel Corp., as was the Tapline pipe. In 30- and 31-foot joints, nested to conserve shipping space, approximately two-thirds of the pipe was shipped to Tripoli, thence being moved by rail to Homs. There it is being denested and welded together into 90-foot sections for trucking to the right-of-way. The remaining third is being shipped to Basra at the head of the Persian Gulf and forwarded by rail to Baiji, where the right-of-way crosses the Tigris River. The triple-jointing plant at Homs, upon fulfillment of its function there, will be transferred to Baiji to process the last increment of the line.

Much of the pipe line right-of-way follows one of the great trade routes of antiquity from Egypt and the Phoenician coast to Persia, traversing the Syrian desert. The reduction in diameter of the line to 26 inches for the last ninety miles is made possible by a sharp drop to the sea, thus maintaining oil pressure by gravity. There are two major crossings, at the Tigris and the Euphrates, about 1,400 feet each. The entire line, weighing nearly 173,000 long tons, will be buried after having been double-coated with coal-tar enamel and double-wrapped with glass fiber and asbestos felt.

Services of recruitment and procurement—apart from pipe line—have been performed in the United States by Bechtel International Corporation, and in the United Kingdom by George Wimpey & Co. Ltd.

Field work is being done by teams composed of Americans, Britons, Syrians and Iraqis. There are 90 Americans and 300 Britons on the job, with a locally recruited force of some four thousand Syrians and Iraqis.

It is noteworthy that Bechtel's policy in handling work abroad is to export the necessary know-how, along with essential supplies and specialized equipment not obtainable elsewhere, rather than large organizations, and to employ and train local reserves of manpower in each operating area, building them up from a nucleus of technicians and skilled craftsmen acting as supervisors and instructors. Thus, in the performance of recent projects in the Middle East, the number of Americans has been reduced to as low as two percent of the total force.

Each American sent abroad is a key man in greater or lesser degree, and infinite care is therefore exercised in the choosing of recruits. To be eligible for overseas employment, an applicant must have had five to ten years' experience in whatever his craft or line of endeavor may be; he must be physically fit and of good character, adaptable, capable of getting along harmoniously with others, and be prepared to work hard under rigorous conditions. Consideration must be given to the fact also, that every American abroad is an unofficial ambassador; by his words and actions his countrymen will be judged.

For many years one of the most beneficial institutions in the Middle East has been the American University of Beirut, Lebanon, which is non-sectarian and privately managed. Its student body is a United Nations in miniature, of various races, religions and nationalities. The several foreign oil companies operating in the Middle East, and Bechtel as well, have given the A.U.B. financial support. A new engineering school is being established there to turn out graduates who will be able to assume important roles in the development and management of the petroleum resources of their respective countries.

Since first venturing into the Middle East, the Bechtel interests, along with the American oil companies, have been keenly conscious of their responsibilities as guests and business men in their relations with peoples and governments. They have consistently sought to do business with their hosts on a friendly give-and-take partnership basis. Thus far, this policy has worked out with mutually happy results.

Night view of the Ras Tanura refinery of Arabian American Oil Co. Photo by Robert Yarnall Richie.

British Columbia Oil Discovery Stimulates Lease Activity

FIRST discovery of oil after years of fruitless search and drilling was made at Fort St. John in the northeastern section of British Columbia on November 1. An analysis of samples from the well, Pacific Allied Fort St. John No. 1, by the Alberta Petroleum and Natural Gas Conservation Board reports that gravity is 38.7 compared with Alberta's Leduc at 37 and Redwater at 36.

Drilled by Pacific Petroleums Ltd. and affiliated firms, the well reported 960 feet of crude in a drill stem test. Discovery was made at 5,633 to 5,655 feet in the permo-Pennsylvanian layer. Indications showed that the well was slightly off structure. With the valve open for 90 minutes gas in appreciable quantities showed in four minutes. In addition to the oil there was 125 feet of gasified mud and 480 feet of salt water.

Pacific Petroleums reports that the well will be drilled another 12 feet and then electrologs will be taken. A second Fort St. John well is down to 3,400 feet and a third planned.

Fort St. John No. 1, the discovery well, is the sixteenth drilled in the area by Pacific Petroleums. Companies participating with Pacific in the area are: Canadian Atlantic, Sunray, Peace River Natural Gas, Empire Petroleums and Hudson's Bay Union. The first British Columbia oil find is ten miles south of Fort St. John in 1sd, 1, sec. 9—83—18 west of sixth. Fort St. John is 50 miles up the Alaska Highway from Dawson Creek.

Another well will be drilled 14 miles from the discovery by British Dominion. This will be a deepening job on Peace River Natural Gas No. 8 which was started a year ago and abandoned at 5,950 feet. Gas and oil stains were found at that time. British Dominion will drill to a depth of 8,500 feet as soon as a rig is available.

Oil and gas drilling in British Columbia has been confined largely to two major companies —Pacific and Phillips Petroleum. Pacific first defined a small gas field near Dawson Creek, then tried for its present oil at Fort St. John.

Another Pacific venture in the Flathead Valley in the southeastern section of the province has a drill at 1,750 feet. The well Pacific Atlantic Flathead No. 1 is drilling in hard cherty dolomite on a 67,000-acre lease.

Phillips drilled a test well at Lone Mountain, made tests near Dawson Creek, and then moved north to the Diaber field where it has an 11,000-foot test with another being spudded.

British Columbia Oil and Gas Development Syndicate plans a well at Lone Mountain as soon as a rig is available.

An Alberta geologist, Dr. Theo Link of Calgary, has expressed optimism over the British Columbia find. "On the basis of the thickness of the sedimentary column in the Peace River northern British Columbia area as compared to other parts of Alberta . . . the total ultimate reserves to be discovered should be greater than in other parts of Alberta," he said.

Oil has been sought in British Columbia for 30 years but only in the northeast section close to the Alberta border have modern techniques been applied to a wide area. Several inconclusive attempts have been made in the Fraser Valley near Vancouver in the Cariboo district, and one attempt in the Queen Charlotte Islands was abandoned.

British Columbia has an estimated 50 to 60 million acres of potential oil land and nearly 11,000,000 acres already under lease or application. Dr. T. B. Williams, petroleum and natural gas controller, said 63 companies hold licenses, leases and permits on holdings in British Columbia. Of these, 22 major companies are interested in the Peace River area.

News of the oil find saw the oil controller's office deluged for permits in the area of the find although territory in the immediate vicinity is already under lease or permit. Imperial Oil Ltd. filed an application for 2½ million acres, its first entry into this area. Applications covering 409,840 acres were approved by the oil office the morning after the news broke. They were sought by H. W. Stevens, Vancouver, 200,000 acres; W. E. Manning, Calgary, 10,000 and 40,000 acres; C. C. Straight, Vancouver, 19,840; H. S. Price, Vancouver, 40,000; and L. A. Williams, Vancouver, 50,000 and 50,000 acres.

Pacific Petroleums, the company which made the strike at Fort St. John, is associated with Westcoast Transmission, the Vancouver-Calgary-backed firm seeking a permit to pipe natural gas from Alberta to the Pacific Coast via an all-British Columbia route. Frank McMahon of Calgary heads both firms. Fort St. John is on the proposed gas line route. If a gas line is built through this area and substantial oil reserves are developed, there would be a possibility of following the gas line route with an oil line.

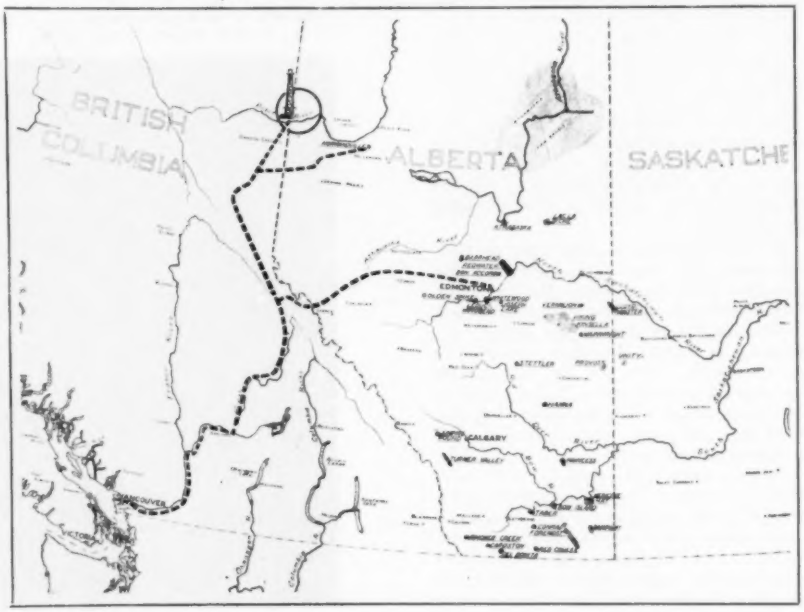
Canadian Bechtel Co., pipe line engineers for the Transmountain Pipeline Co., one of the companies seeking permission to pipe Alberta oil to the Pacific Coast, has opened bids from 15 contractors on the $86-million line from Edmonton to Vancouver.

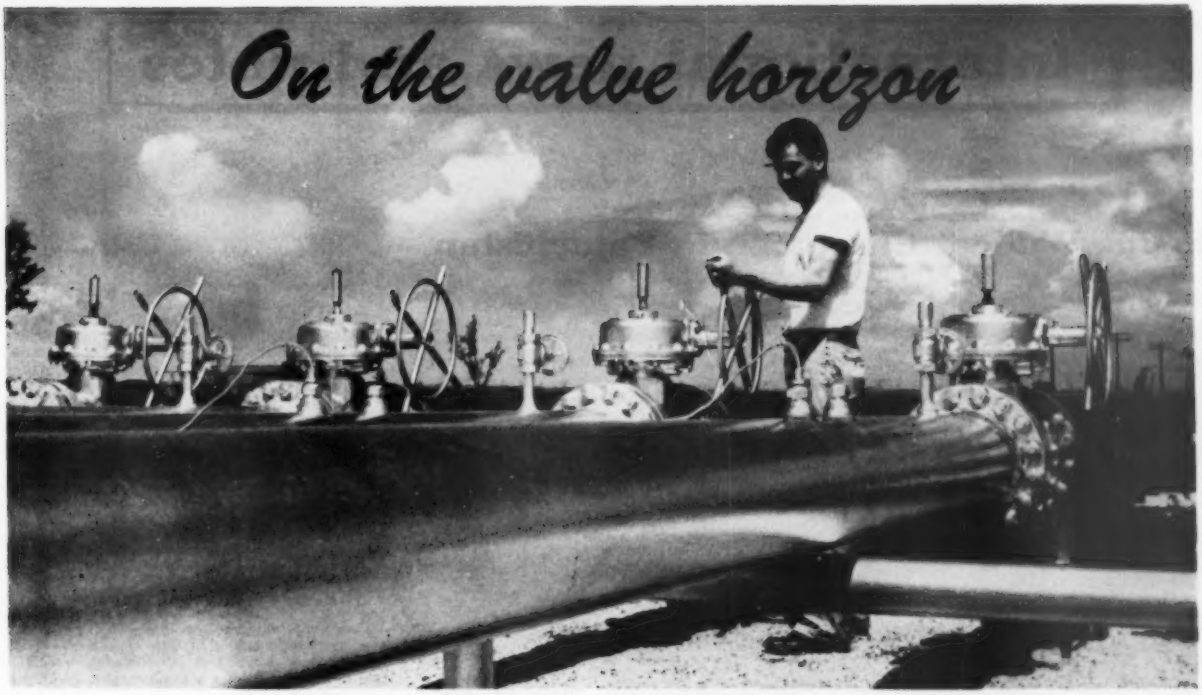
Transmountain's opening of the bids followed a tour of the 715-mile route by the contractors, four American firms and 11 Canadian. Of these, eight are pipe line builders and seven are clearing and grading contractors. If the federal government's Board of Transport Commissioners in Ottawa should give Transmountain permission to build, work could start in the spring of 1952. Financing arrangements are now being completed.

Transmountain shareholders include Imperial Oil, Socony Vacuum and Gulf, who hold a major portion of Alberta's presently-defined oil reserves.

Present plans consist of a 24-inch pipe with an initial daily capacity of 75,000 barrels and a maximum of 200,000 barrels. Unlike the gas line, the oil line has no opposition from the Alberta government or local interests. The Bechtel group estimates the entire project could be finished in two years.

Map showing proposed Peace River-Vancouver gas line which could be paralleled conveniently with an oil pipe line if adequate crude reserves are developed in northeastern British Columbia.





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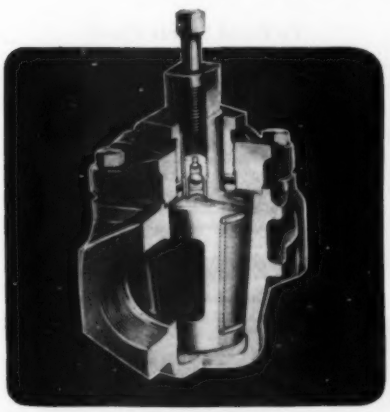
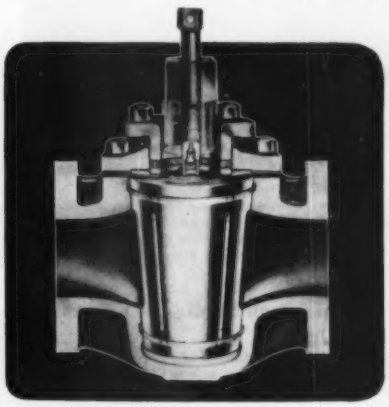
Sizes from ½" to 34". Pressures from vacuum to 15,000 lb. test. Nickel steel valves for sub-zero service and merchrome coated for high temperatures. Ask for descriptive literature.



SCREENED GLAND TYPE



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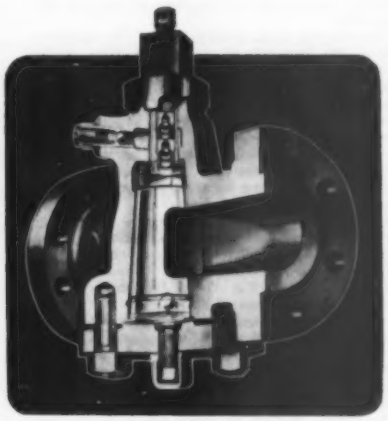

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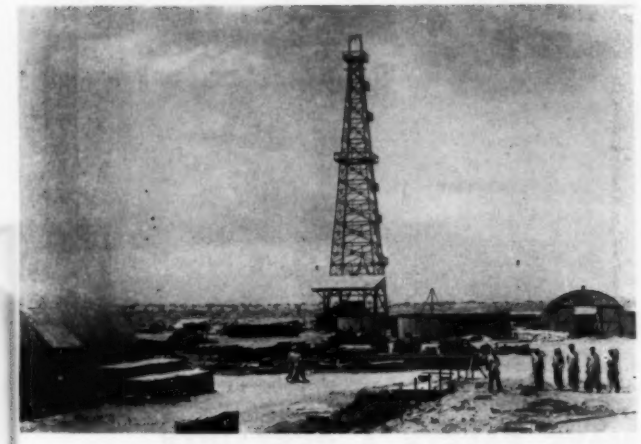
International news and notes

Begins Wildcat Campaign in Baluchistan



Heavy duty diesel rig which is drilling a deep test in Baluchistan.

Pakistan Petroleum Ltd. spudded in its first test well at Sui, Dera Bugti (Baluchistan), October 10. The test well is being drilled by a heavy-duty diesel rig at a site selected on the basis of geological work and aerial reconnaissance of about 5,000 square miles of Mari-Bugti territory which led to the discovery of the Sui anticline.

Prospecting area is situated at the southern end of the Sulaiman range, and consists chiefly of narrow parallel ridges of closely packed hills which form the gradual descent from the Sulaiman plateau into the plains. Though it is intersected by hills, torrents and ravines, it is, generally speaking, barren, rugged and sandy, poorly supplied with water and inhospitable. The climate, ranging from 125° in the shade in summer to below freezing point in winter, makes the country very difficult for work.

Preliminary work started early this year when the government of Pakistan granted an oil prospecting license. To expedite work, the company opened a railhead base at Kashmor on the narrow gauge railway from Jacobadad to receive about 6,500 tons of stores required for the project. The test well site was a desolate spot with not even a foot track leading to it. A new 35-mile road was constructed to connect the well site with Kashmor railroad. Simultaneously a 40-mile four-inch pipe line was laid with a pump station at the Indus river and a second intermediate booster station to pump water to the test camp in the desert.

A camp for about 150 people was built. The houses are Nissen huts of special design with mud lagging to alleviate the great heat in summer and the cold in winter. A power station has been built to supply electric power for the well and light for the camp and for a hospital with an air-conditioned ward for heat-stroke patients. An air strip near the site has been constructed to enable landing of the company's plane and to ensure speedy movement of staff and urgent stores.

Communication is maintained by radio with Karachi headquarters and a direct telephone line has been laid to connect the test well with the Kashmor railhead. A canteen and foodshop is operated for employees at cost prices.

Camp at site of Baluchistan wildcat. In addition to quarters for workers and staff, the camp includes a hospital, canteen, garage, workshop and office.

Pakistan Petroleum Ltd. is going all out in intensified exploratory operations on a scale not equalled in the sub-continent's history of search for oil. The present well is to be carried to 10,000 feet. At the end of October the depth was 1,029 feet.

Seismograph Studies in Romania

In the Campina region, the SOVROM-Petrol, joint Soviet-Romanian oil company, is conducting seismic studies using new apparatus developed by Soviet Professor Sorokin. The apparatus is said to be of especial precision; it is being used for the first time in Romania, and SOVROM-Petrol managers hope by its use to find new oil deposits.

Secondary Recovery in Romania

Water flooding is being undertaken in many settled fields in Romania in an effort to meet the very large new quota which has been assigned to the industry by government authorities. Water tanks and pumps are being installed in all major areas. Previously abandoned wells in the Dacian area are being repaired and reopened for flooding.

In one area about 200 metric tons of water is being pumped into three input wells. Current oil recovery in this area is reported at 150 tons of oil per 200 tons of water injected. It is estimated that two million cubic meters of water will be required to complete the flood of the Meonic horizon.

The current propaganda line in Communist publications is that the Americans and British exploited Romanian fields uneconomically while they were operating in that country with the result that much of the oil was left in the sand at the time wells were abandoned. The daily Scanteia recently charged, for example, that Americans took 25,000 tons of oil from one well at Baicoi and 52,000 tons from another without following the most basic rules of rational exploitation.

Agerpress reported early in October that Romanian output was 17,000 tons higher than the quota established for the first 20 days of September. Outstanding examples of fields with good increases in output were Suta-Soaka, Cobia, Targoviste, Moreni and Tintea.

Pemex Refinery Expansion

Petroleos Mexicanos has announced plans for a 46,000,000-peso ($5,500,000) expansion of its Atzcapotzalco refinery in Mexico City, in addition to installation of a six million peso desulfurization plant in the same refinery. Officials of the government oil agency predicted the new refining unit's capacity will be 20,000 barrels of crude daily.

Other construction projects reported to be approved by the agency call for construction of a 2,500,000-peso shipyard at Tampico to repair Pemex tankers. The project, which is being directed by Alvaro Villasana, a local engineer, is expected to be finished before the end of 1952. Another project is the building of a 500,000-peso addition to Pemex' tank farm at Aguascalientes, in the state of the same name.

To Build Sulfur Plant

Royalite Oil Co., Ltd. of Calgary has placed an order with Foster-Wheeler Ltd. of Toronto for the fabrication of its sulfur recovery plant to be erected in Turner Valley, about 30 miles southwest of Calgary. Site for this $350,000 plant is adjacent to the present gas plant facilities at Turner Valley. The plant is expected to be in operation in April 1952. Capacity of the plant will be around 30 long tons per day. During first year of operation it is expected that production will be approximately 9,300 tons.

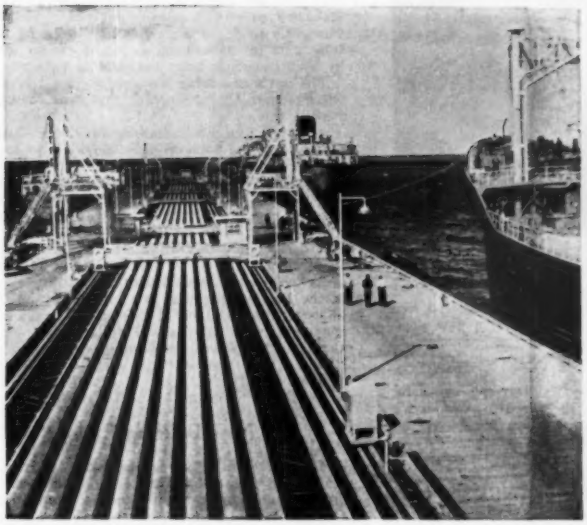
Egypt to Encourage Exploration

In a recent interview, Mohammed Soliman Ghanam Pasha, Egyptian minister of commerce and industry, said that the Council of State is considering a proposed law which for a limited time will reduce by two-thirds the royalty on oil produced from new fields remote from existing producing fields. The reference is to the unprospected eastern desert. This move is an effort to increase domestic petroleum production, which now amounts to 1.5 million tons out of a national consumption of 3.5 million tons.

Canadian Grease Plant

The British American Oil Co. Ltd. will build a new $1,500,000 grease plant at its refinery at Clarkson, Ontario. The plant is to have a capacity of 15-million pounds yearly and will reduce imports from the United States. The plant, which will be British American's first major grease manufacturing installation, is expected to be completed late in 1952 and will be equipped to manufacture a full range of automobile, industrial and aviation greases.

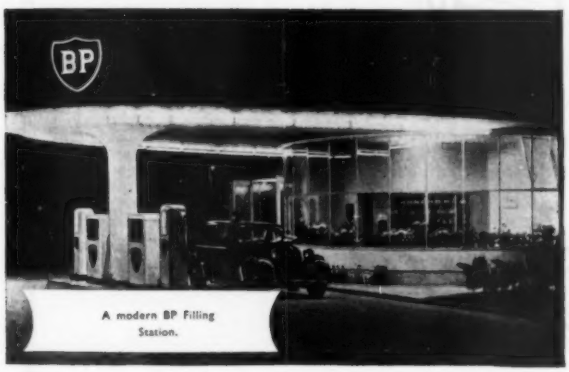
Oil Transport and Services



The perpetual motion of oil on its complicated journey from field to filling station is being accelerated constantly by Anglo-Iranian's international transport organisation. Above is a view of ocean-going tankers at an oil-loading jetty.

The first cargo of oil arrived in February this year at Anglo-Iranian's new deep-water, off-loading installation at Finnart on Loch Long, Scotland. From here the oil makes a coast-to-coast journey by pipeline to Grangemouth refinery.

Many famous international airlines are regularly served by the BP Aviation Service.



A modern BP Filling Station.

OIL PRODUCERS and refiners in the Middle East since 1912, Anglo-Iranian Oil Company and its associated companies operate eleven refineries in the United Kingdom, France, Germany, Italy, Israel, Irak, Kuwait and Australia. Their sales organisation includes major marketing or supply interests in Europe, Asia, Africa and Australasia, with international ships' bunkering and aviation services.

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Builds Petrochemical Units

Pan-Am Southern Corp. will enter the petrochemical field shortly with the addition of two manufacturing units at its El Dorado, Ark., refinery. Products will be polybutene for motor oil additives and propylene tetramer for synthetic detergents. The polybutene unit is to be completed by Feb. 1, 1952.

The unit to be operated at El Dorado will be able to produce more polybutene than is currently sold in the entire nation, two million gallons per year. In addition to its use in lubricating oil additives, polybutenes are used in calking and sealing compounds, electrical condensers and capacitors, aluminum roll oil, surgical tape and pressure sensitive industrial tapes, laminated paper, tracing paper and surface coating materials.

The propylene tetramer unit is being constructed by revamping the present polymerization unit at El Dorado so that either poly gasoline or tetramer can be produced. Production of tetramer by the unit will be approximately 3,800,000 gallons a year.

Diesel Fuel Survey

Analytical data for 303 samples of four grades of diesel fuel highlight the report of the second national annual diesel-fuel survey conducted jointly by the Bureau of Mines and the American Petroleum Institute.

The report presents the tabulated data in four grade groups in accordance with specified limitations set forth by the American Society for Testing Materials. A comparison with the 1950 survey shows that there has been little change in the quality of diesel fuels during the past year as an examination of average, minimum and maximum values of the fuels covered in the 1951 survey fails to reveal any great differences from the 266 samples described in the report of last year's survey. In general, the data indicate that high-quality fuels are being supplied to meet the special requirements of the various grades.

Davison Chemical Promotes Officers

R. L. Hockley M. G. Geiger

M. G. Geiger, formerly executive vice president of Davison Chemical Corp., has been elected vice chairman of the board of directors, a new position. R. L. Hockley, previously vice president for marketing, was elected executive vice president to succeed Mr. Geiger.

Largely increased sales of Davison synthetic petroleum catalysts have increased the company's earnings recently, the company reported at the close of last quarter's business.

Mud Testing Catalog

The Geophysical Machine Works, Houston, Texas, has published a new catalog describing its entire line of mud testing equipment. This new catalog illustrates and gives all specifications of the Fann mud balances and V-G (Viscosimeter) meter and accessories, Fann portable and multiple filter presses, small size pressure adapters for older types of filter presses and mud mixers.

To Build Aromatics Plant

New Platforming units and a Udex extraction unit for production of benzene and toluene are being built at the Roosevelt Oil and Refining Corp. in Mount Pleasant, Mich. The three units will produce 3,000,000 gallons of benzene and 3,250,000 gallons of toluene per year. The Platformer is to be supplemented by a second catalytic unit for saturating aromatic charge stocks by hydrogenation over platforming catalysts.

The units are being designed by the Universal Oil Products Co. of Chicago and constructed by Procon, Inc.

Although designed primarily for the production of benzene and toluene, the Roosevelt units are to be of sufficient capacity to permit processing of gasoline requirements as well as the benzene and toluene. To do this, Roosevelt contemplates running the Platformer blocked out on benzene-toluene part time and on naphtha stock for motor gasoline which will more than meet market requirements for the remaining time. The other units will run continuously. Design capacity of the Platforming unit is 1,750 BPSD on gasoline operation or 1,140 BPSD on benzene-toluene operation. An auxiliary Platformer to be included in the scheme is designed to process 440 BPSD. The extractor will operate at the rate of 1,200 BPSD.

New Drilling Rigs

IDECO recently introduced two new rigs in the 750-hp class which are designed for two or three engine application. The series introduces a unique feature by means of which the mechanical drive model rig can be converted at any time to torque converter drive. This is accomplished by installing high speed engines and torque converters, changing one sprocket, and modifying the air control system. This feature enables the operator to use his existing low speed engines, and at a later date modernize the rig when engine replacement is made.

MILLENNIUM-KEY

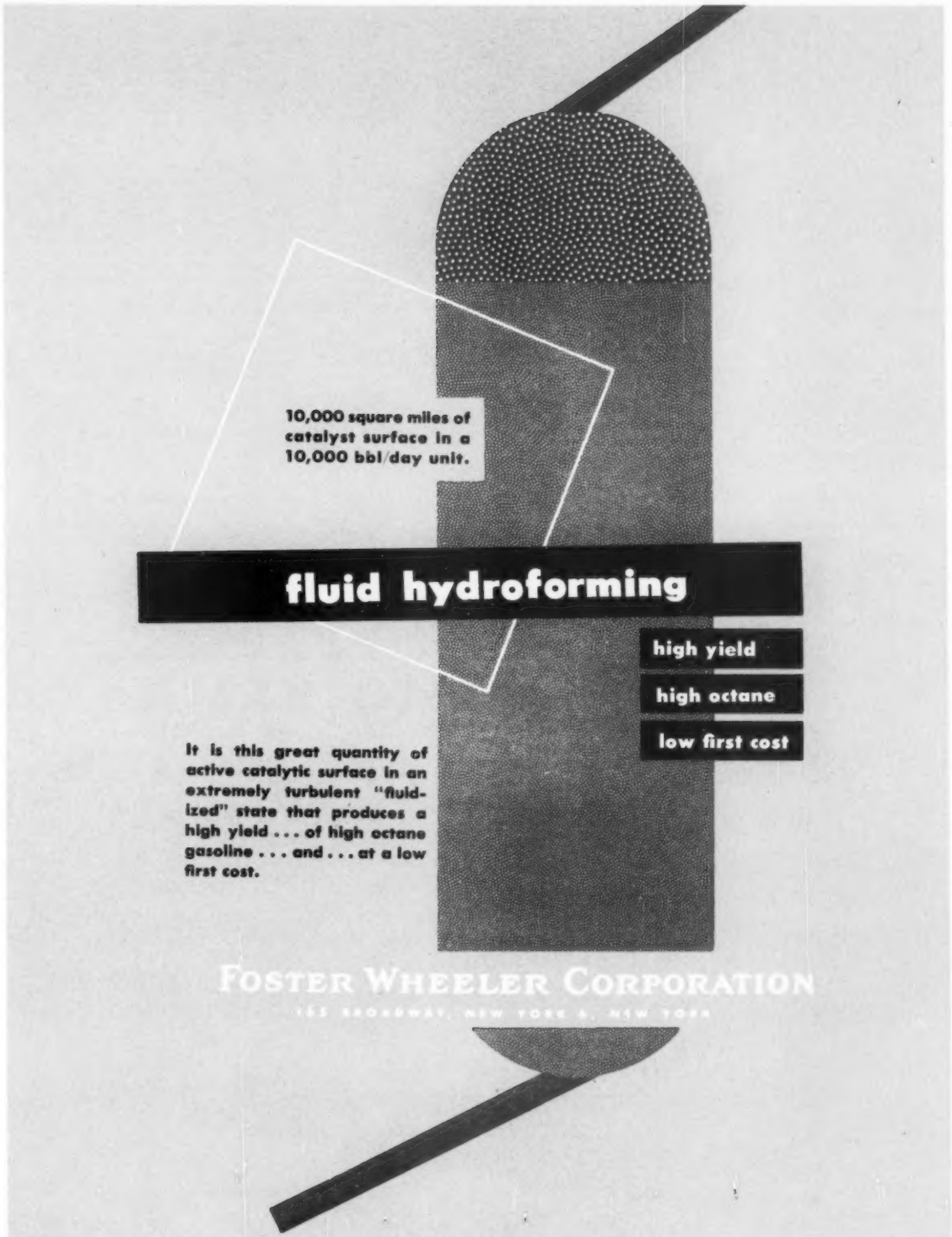
PETROLEUM FITTINGS

MILLENNIUM KEY

Cast Steel Fittings for oil refinery and chemical plants are manufactured throughout at Braintree by Lake & Elliot Ltd. Close metallurgical control is maintained by competent chemists working with modern apparatus. The independent inspection department can carry out inspection or work in conjunction with customers own inspectors.

Lake & Elliot Ltd.

BRAINTREE ENGLAND


10,000 square miles of catalyst surface in a 10,000 bbl/day unit.
fluid hydroforming
high yield
high octane
low first cost
It is this great quantity of active catalytic surface in an extremely turbulent "fluidized" state that produces a high yield . . . of high octane gasoline . . . and . . . at a low first cost.
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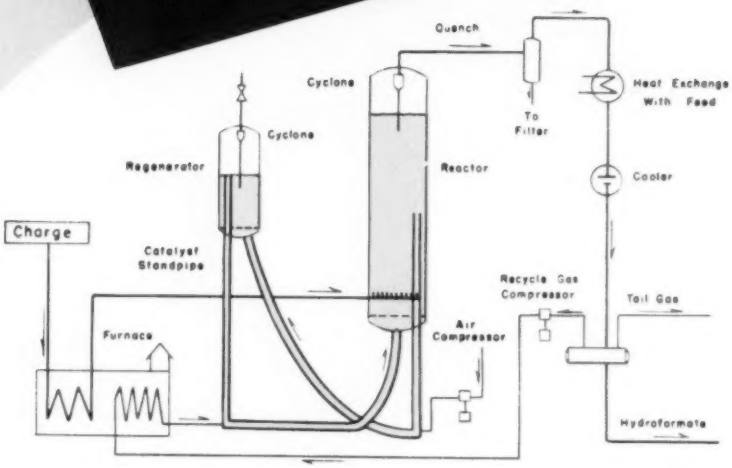
fluid hydroforming



The "fluid" principle, as applied to hydroforming, provides all the distinct advantages of full, continuous operation. Its inherent process variables also makes possible a more exact control of the intensity of the hydroforming reaction.

Foster Wheeler's Fluid Hydroforming Pilot Plant is available for stock evaluation and determination of process design data.

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165 BROADWAY, NEW YORK 6, NEW YORK

Snyder Plant Processes 70 Million Feet Daily

Loss of gaseous hydrocarbons from lease stock tanks is materially reduced through an innovation in conventional gathering system designs in the Snyder field. This departure is the use of interstage heaters between gas separators on individual leases, a feature of the new Snyder natural-gasoline plant owned by 30 companies and 60 individuals in the Scurry county, Texas oil field.

The plant, operated by Sunray Oil Corp., is a cooperative $8 million project for the conservation of gas and manufacture of natural gasoline products. It was formally dedicated on Oct. 23.

Advantages of the interstage heating between gas separators include: (1) substantial reduction in the size and tonnage of pipe required for the low pressure gathering system since all separators will be operating at a pressure of 15 psi. for delivery of gas to the low pressure system. (2) Constant casinghead gasoline content is obtained from the individual leases. The new method eliminates the effect of climatic conditions on gasoline recovery from the gas. (3) Maximum volume of flash gas is separated and recovered from the crude oil, obviating the necessity for lease owners or plant participants to elevate their separators.

Refinery In India

Standard-Vacuum Oil Co. has confirmed that it is negotiating with the Government of India for the construction of an oil refinery in that country. Stanvac has marketed in India for more than 50 years. Currently it is making extensive additions to plant and equipment at its inland bulk storage and ocean terminal facilities costing several million dollars. In October Stanvac started an extensive aerial magnetometer survey of the Bengal Basin to determine whether there are geological formations which might offer prospects of finding oil in that area.

Du Pont Reassigns District Managers

R. M. Glover C. D. Towery A. R. Mullis

Changes in the managerships of three district offices of Du Pont's petroleum chemicals division will become effective January 1.

R. M. Glover of the Wilmington sales office will become manager of the Mid-Continent district at Tulsa, Okla. Charles D. Towery, the present manager at Tulsa, will be transferred to Houston, Texas, as manager of the division's Gulf Coast district. Alfred R. Mullis, district manager at Houston, has been named manager of the eastern district in New York City. E. Hearn Simpson, acting manager of the eastern district office, will return to Wilmington to resume his duties as sales manager of the petroleum chemicals division.

Gulf to Build Sulfur Plant

Gulf Oil Corp. will build a 20-ton sulfur recovery unit at Waddell, Texas. The recovery plant will be completed by Feb. 1, 1952. Currently the Waddell natural gasoline plant is processing approximately 38 million cubic feet of casing head gas daily from which approximately 45,000 gallons of natural gasoline, 17,000 gallons of butane, and 20,000 gallons of propane are produced.

Hoover Receives Coonley Award

At its annual conference in New York, Oct. 22-24, American Standards Association awarded its Howard Coonley medal to former President Herbert Hoover in recognition of his prominent part in promoting the general adoption of standardization throughout American industry. Presentation of the medal and accompanying citation was made by Dr. Robert E. Wilson, chairman of the board of Standard Oil Co. (Ind.).

In his address, Dr. Wilson pointed out that of all the hopes and dreams that inspired the younger generation at the close of World War I, the one that had more than fulfilled expectations was the progress of technology which, by eliminating waste in industry, adding to the skill of workers and multiplying production, not only had brought great material benefits, but had provided the means for building a culture without parallel in history.

He hailed Mr. Hoover as the outstanding leader in this progress as an engineer, as first president of the American Engineering Council—forerunner of the Standards Association—as Secretary of Commerce, and more recently as head of the commission on organization of the executive branch of the federal government.

In his response, Mr. Hoover referred to the advantages resulting from the adoption of uniform standards and the great part it has played in economic development. With few exceptions, he said, this progress has been obtained by voluntary action within industry and has not been imposed by law.

John W. White

John W. White, former president of Westinghouse Electric International Co., died recently in Mexico City, where for the past five years he had been managing director of Industria Electrica de Mexico, S.A. Mr. White became general manager of Westinghouse International in 1936 and was elected president in April, 1944.

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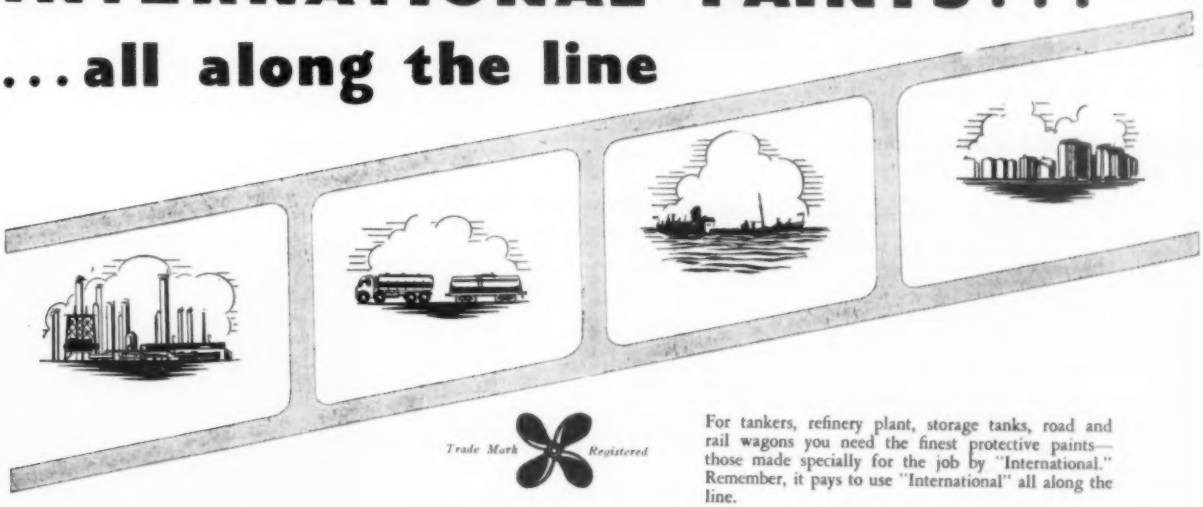

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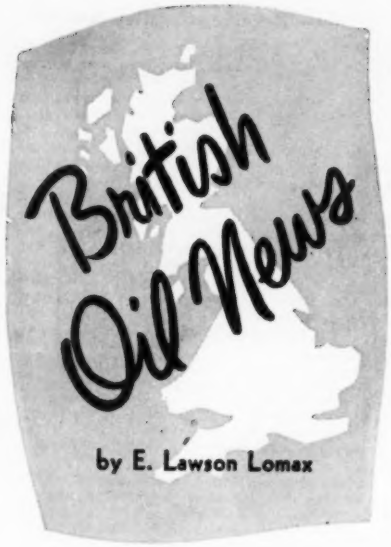

British Manufacturers On O.E.E.C. Mission

Representatives of eight European countries left Paris by air for Washington on Oct. 20 to form O.E.E.C. missions 57 and 68 to study equipment for the oil industry. The mission was divided into two groups, one particularly interested in refining equipment, the other in drilling equipment. Its British contingent was drawn from members of the Council of British Manufacturers of Petroleum Equipment.

Led by its vice chairman, Douglas Wilson, of the United Steel Companies Ltd., those taking part included: Frank Kenyon, director of Wm. Kenyon and Sons Ltd.; S. C. Mackensie, field engineer, the Oil Well Engineering Co. Ltd.; and J. Steel, sales manager, Ruston and Hornsby Ltd. The party proceeded first to Washington and then over an extensive itinerary, lasting until the end of November, which included the high spots of the American petroleum industry.

Council of British Manufacturers of Petroleum Equipment Meets

A luncheon marking the first annual general meeting of the Council of British Manufacturers of Petroleum Equipment following its incorporation was held in London October 4 with over 400 representatives of the oil and oil equipment industries attending.

Principal speaker was Howard W. Page of Esso Petroleum Co. Ltd. who praised the rapid strides made by British oil equipment manufacturers during the last few years and pointed out the real and continuing opportunities for the future.

Mr. Page went on to examine the question of whether large scale manufacture of oil equipment in Britain is on a sound footing, since before the war relatively few opportunities existed for such manufacture. The answer to this question Mr. Page found in the fundamental change which has taken place in the industry. Before the war the American petroleum industry was predominant, with large surpluses of crude productive and refinery capacity. High grade crude could be purchased at Gulf Coast ports for as little as $8.10 per ton, and such prices, together with available refinery capacity, set limits to expansion outside the United States except in areas where special conditions existed, e.g. government subsidies (France), available crude coupled with advantageous freight rates (Persian Gulf and East Indies), and plants for the manufacture of specialty products such as asphalt and lubricating oils.

Refinery capacity in Europe is at present 60 million tons per year, compared with 15 million tons before the war, most of which was not suitable for handling Middle East crudes, thus making expansion against American competition unpromising. Today, with the American crude which sold in 1939 at $8.10 now $19.30, the development of crude from other sources is becoming more and more economic, and can even compete in areas where there is a freight disadvantage. The demand for European refineries to process the more competitive Middle East crudes is increasing, and it is this fact which presents new opportunities to the British manufacturer.

E. F. E. Howard, chairman of the council, in introducing Mr. Page said that the gathering showed the council to be established as an essential adjunct to the petroleum and petroleum equipment industries, stressing that this would not have been possible without the willing and complete cooperation of the oil companies, the British Standards Institution and government departments. He added that council members were today well equipped to meet the needs of the petroleum industry, provided that essential raw materials were available and that, with a heavier defense program, cognizance were taken of the essential importance of the petroleum industry in the total economy.

E. F. E. Howard, chairman of the Council of British Manufacturers of Petroleum Equipment, with Douglas Wilson, vice-chairman, welcoming Howard W. Page of Esso Petroleum Co. Ltd. who was the principal speaker at the Council's first annual general meeting.

Announce Production Figures

The Kuwait Oil Company, Ltd. announces that crude oil production figures for the months of August and September were 2,892,059 and 2,548,717 tons respectively. Production for the year through September has reached a figure of 19,098,465 tons.

Apex (Trinidad) Oilfields, Ltd. reports production of crude and casinghead gasoline for September at 272,000 barrels, while Anglo-Ecuadorian Oilfields, Ltd. reports 21,993 tons for the same month.

Production figures of the Iraq Petroleum Co. Ltd. for September were as follows: Kirkuk field, 681,967 long tons; Qatar field, 198,019 long tons.

First Gas Turbine Tanker

The first British merchant ship to be fitted with a gas turbine, the Shell tanker "Auris" of 12,000 dwt, has completed her trials after the fitting of a gas turbine in place of one of her four diesels under the direction of John Lamb, OBE, head of the Shell Marine Research and Development department. She has now set sail, without any further adjustments, for Tampico, where she will load a normal cargo of oil products. During the voyage, experiments will be made on driving the vessel solely by use of the turbine unit.

Tanker Launchings

The month of October was marked by the launching of a number of large tankers, the largest of which was the "World Unity," a vessel of 32,000 dwt, which was launched for the North American Shipping and Trading Co. (London) Ltd. at the Barrow Yard of Vickers-Armstrong Ltd. on Oct. 16. It is the first of six tankers of this size or larger now being built for the company, and is the largest so far to be launched from a British shipyard. On Oct. 3, the 20,000 dwt tanker "S. S. Saxonglade" was launched at the Walker Naval Yard of Vickers-Armstrong for the same interests.

Harland and Wolff Ltd. has completed at Goven the "M. W. Ballsta," a single-screw motor-driven tanker, and the vessel has been handed over to Fred Olsen and Co. of Oslo, on the successful completion of her sea trials. She had a dead weight capacity of approximately 24,000 tons.

The "Iliade," a single-screw motor-driven oil tanker of an approximate dead weight capacity of 18,700 tons, built for Societe Navale Delmas-Vieljeux and Societe Anonyme Courtage et Transports, Paris, was launched on Oct. 11 from the same yard.

The "London Victory" of 18,200 dwt has been launched by the Furness Shipbuilding Co., and is the first of a new series of tankers being built for the London and Overseas Freighters Ltd. (Lamber Brothers.)

The "British Bulldog," built for British Tankers (Anglo-Iranian Oil Co. Ltd.) by Swan, Hunter and Wigham Richardson Ltd. and launched on May 23 last, has completed her fitting out and trial trips.

The "S. T. S. Velletia," the last of the four "V" series of 28,000 dwt tankers of the Anglo-Saxon Petroleum Co. Ltd., was launched on Oct. 31 at the Wallsend Shipyard of Swan, Hunter, and Wigham Richardson Ltd.

First Test Drilling In Nigeria

Surface seepages have for a long time indicated the possibility of oil deposits existing in Nigeria, and before the war the Shell and Anglo-Iranian organizations were granted exploration permits by the Nigerian government for concessions covering about 60,000 square miles.

A large amount of exploratory work had been carried out prior to 1940, but these activities were suspended until 1946. Since then, further exploration, including seismic and gravity work, has been carried out at a total cost of about £1,500,000.

In September 1951 a new company, the Shell-D'Arcy Petroleum Development Co. of Nigeria Ltd. was formed and the first well under its auspices was recently spudded near Owerri, in the eastern part of the country, in the presence of local notables.

Mrs. Humphries, wife of the technical manager, Ihuo Location, Owerri, Nigeria, engages the rotary clutch at ceremonies marking the spudding-in of the first deep test well in Nigeria.

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SPIRAX LETTERS — NO. 11

Separation orders

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WHEN YOU ARE AT PAINS to get the condensate away from process and heating steam spaces, it is hardly reasonable to let in at the other end any more water than you can possibly help.

A good drainage installation on the steam supply mains (see Drawing No. T.125) will remove water, passing along the pipes, before it can get into the process plant.

But generally the incoming steam itself is loaded with a "mist" of moisture particles that cannot be separated from the steam by the mains trapping installation.

The moisture is a heavy liability. It has no Latent Heat and *greatly increases the resistance to heat transfer at the condensing surfaces of the process plant.*

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Fuel Luncheon Club Elects

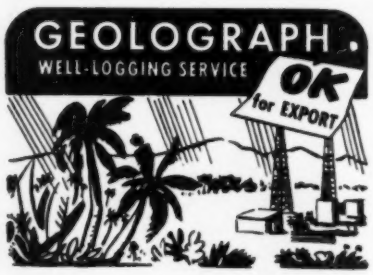
H. Cunliffe

H. Cunliffe, fuel oil manager of Shell-Mex and B. P. Ltd., has been elected president of the Fuel Luncheon Club.

Mr. Cunliffe served with the R.F.C. and the R.A.F. in the first World War, and joined Shell-Mex Ltd. upon leaving the service. Before the outbreak of the second World War he was manager of the Hull branch of the company. He joined the army in 1939 and served at the War Office in the Directorate of Supplies and Transport on the supply of petroleum products for the army. In 1942 he became an oil adviser on smoke production for anti-aircraft defenses in the Ministry of Home Security. Thereafter he worked on the Petroleum Board developing lubricant extracts. On the dissolution of the board he became manager of the Birmingham division of Shell-Mex and B. P. Ltd., and in 1950 was appointed fuel oil manager of the company.

C. P. Newman

C. P. Newman, chairman of Newman, Hender and Co. Ltd., died Oct. 16 at the age of 76. Mr. Newman was born in Gloucestershire in 1875 and educated at Wycliffe College. He joined the firm of Newman and Co. upon leaving school in 1890. There he learned the art of brass founding and gradually assumed management of the business, which had been founded by his father in 1879. At 21, following amalgamation with another concern, Hender, Stevenson and Co., he became joint managing director of the new company, Newman, Hender and Co. Ltd.



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Work At Abadan Partly Resumed

Early in November partial runs were resumed at the Abadan refinery, now being run by the Iran Oil Co., in order to satisfy the current demand for mineral oil products on the Persian market. One of the distillation units is said to be processing 80,000 barrels of crude from the Agha Jari oilfield.

All plants in the oil town at the Schatt-el-Arab, which today has a population of more than 200,000, are still in the same state as a few weeks ago when the last British engineers and officials left. Military and police guards are protecting the deserted houses in the European residential quarters. The Swedish director of the fire department, Malte Heister, is at present the only European who holds an office in the new Persian company. The arrival of ten German doctors who are to take up positions in the modernly equipped Abadan hospital is expected in the near future.

National Benzole Changes

The directors of the National Benzole Co. Ltd. have appointed H. H. Bates, formerly a member of the executive committee of the board, as managing director to succeed R. J. Smith, who is retiring due to ill health.

Mr. Bates was educated at King Edward VII School, Sheffield, and New College, Oxford, where he gained a first class honors degree in chemistry, and served in the special brigade of the Royal Engineers during the first World War. He joined the staff of Burt, Boulton and Haywood Ltd., at Silvertown in 1923, and became commercial manager of their Paris office in 1925. In 1928 he went to Germany, where for six years he was attached to the by-products section of Neunkircher Eisenwerk.

H. H. Bates

Returning to England in 1935, he accepted an appointment with the South Western Tar Distilleries, for which he has been general manager since 1941. Mr. Bates, who has been a member of the board of National Benzole Ltd. since 1946, is a director of the National Benzole Association and of Burts and Harvey Ltd. of Totton.

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Brigadier Longrigg Retires

Brigadier S. H. Longrigg

The Iraq Petroleum Co. Ltd., announces the retirement, after 20 years of service, of Brigadier S. H. Longrigg.

Brigadier Longrigg spent the latter part of World War I in Iraq, then Mesopotamia, remaining there in government service until 1931, when he joined I.P.C. He served the company for five years in Palestine, being mainly engaged in land acquisition, labor organization and government relations arising out of the construction of the first trans-desert pipe line. He was also responsible for the compilation of a complete record of all operations leading to the successful completion of that line.

He was then transferred to London as manager of petroleum concessions in Arabia, Syria, Kuwait, and Aden. After the second World War he was for a time governor of occupied Italian colonies. He is the author of standard historical works on Iraq and Eritrea.

Launch Second Caltex U.K. Tanker

Overseas Tankship (U.K.) Ltd., Caltex Group affiliate, has launched the M/S Caltex Tanganyika, second of nine tankers it is now building in the United Kingdom. The vessel, built by William Doxford & Sons, Ltd. of Sunderland, England, is 491 feet in length, 61 feet nine inch beam and has a deadweight tonnage of 12,000. This vessel is powered by a 5,150 hp Doxford diesel and will have a trial speed of 13¾ knots.

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IN VENEZUELA

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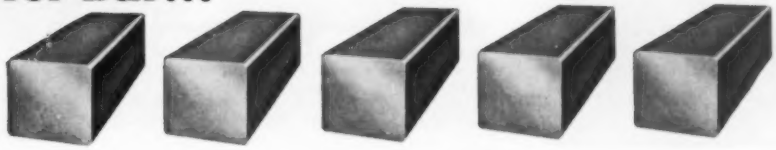

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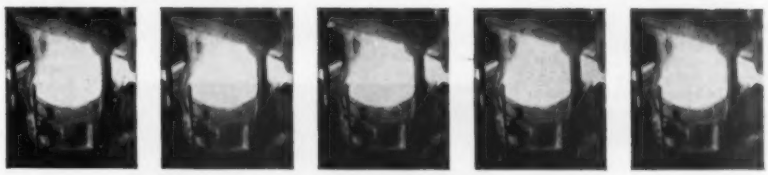

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Oil company staff changes

E. F. Battson

E. F. BATTSON, Houston, administrative vice president of Continental Oil Co., has been elected a director. W. C. MacMillan, Houston, senior vice president, resigned as a director, expressing the wish to restrict his activities due to ill health.

Mr. Battson has been with Continental for nearly 30 years. He was elected vice president at New York in 1948. He became vice president and regional general manager at Denver in February, 1949, and early this year was appointed administrative vice president.

Mr. MacMillan, who was born in Williamstown, Mass., attended Brown University, and joined Continental in geological work in 1928. He rose through exploration and production assignments, being elected vice president in charge of production in 1943. He has successively served as vice president and administrative assistant to the president, executive vice president and senior vice president.

F. C. SEALEY and **E. M. BUTTERWORTH** have been elected vice presidents of California Texas Oil Co., Ltd. as of October 1.

Mr. Sealey has been associated with the oil industry during his entire business career which began with The Texas Co. in 1917 as an assistant geologist. The past 13 years have been devoted to petroleum producing activities abroad, and since July 1949, Mr. Sealey has been in charge of producing and exploration for the Caltex-Bahrein group of companies with headquarters in New York.

Mr. Butterworth, who is a geologist by training, began his oil business career after graduation from the University of California in 1916. He was for a considerable period active in the East Indies, beginning in 1924, when he conducted a group of exploration men in that area. Mr. Butterworth has been directly concerned with government relations in Sumatra and New Guinea for the past several years for the Caltex-Bahrein group.

F. C. Sealey E. M. Butterworth

DR. FREDERICK E. FREY, assistant director of research of the Phillips Petroleum Co., Bartlesville, Okla., has been elected chairman of the American Chemical Society's Division of Petroleum Chemistry for 1952. He succeeds Dr. Bernard H. Shoemaker, assistant director of research of the Standard Oil Co. of Ind., Whiting, Ind.

A. L. Lyman, director of the Richmond (Calif.) laboratories of the California Research Corp., was chosen chairman-elect, and Dr. Warren F. Faragher, technical adviser to the vice-president in charge of research, Houdry Process Corp., Marcus Hook, Pa., was named secretary-treasurer.

Marine Operations Coordinated

Establishment of a new office to coordinate all of the company's world-wide transportation activities has been announced by Standard Oil Co. (N. J.). The staff, which will begin operation January 1, will be headed by John J. Winterbottom as coordinator, and Loren F. Kahle as deputy.

Duties of the office will be to counsel the company's domestic and foreign affiliates in working out arrangements to meet their crude oil and product transportation requirements. The principal office of the transportation coordinator will be in New York. Contacts with affiliates in the Eastern Hemisphere will be maintained through a London office.

J. J. Winterbottom L. F. Kahle

Mr. Winterbottom joined Jersey Standard's Marine department, now the Esso Shipping Co., in 1916 as a traffic clerk. In 1930 he was made assistant to the advisor of European affiliates. In 1938 he became assistant manager of the traffic division, marine department, and was appointed manager in 1940. In 1942 he went to Aruba as marine manager of Lago Oil & Transport Co. Ltd., and in 1944 was loaned to the War Shipping Administration in Washington as director of tankers. Returning to the Marine department, he became assistant general manager in 1945 and executive vice president of Esso Shipping Co. in 1950.

Mr. Kahle joined the Jersey Standard organization as a refinery laborer after his graduation from Iowa State College in 1924. Until 1941 he was engaged in pipe line and production work in Mexico and Venezuela, and served as superintendent of the Caripito terminal of the company's Venezuelan affiliate. After working with the U. S. Navy in World War II, he joined The Carter Oil Co. in Tulsa as superintendent of petroleum transportation. In 1944 he became executive vice president of Interstate Oil Pipe Line Co., and was elected president in 1945. From 1949 until a few months ago, when he became assistant to the pipe line advisor, Mr. Kahle was executive vice president of the Interprovincial Pipe Line Co. in charge of the construction of that company's pipe line system from the Alberta, Canada, oil fields to Lake Superior.

D. A. Graham

D. A. GRAHAM, superintendent of the grease and compounding department of Socony-Vacuum Oil Co., Inc. at Trenton, Mich., has been transferred to the company's headquarters at New York as manager of the operations division of the manufacturing department. Mr. Graham started 20 years ago with the White Star Refining Co. at Trenton, later acquired by Socony-Vacuum, as assistant manager of the grease plant.

HOWARD C. PYLE has been elected president of the Jergins Oil Co. Mr. Pyle was for some years chief production engineer for Union Oil Co. of Calif., later became vice president of the Bank of America in Los Angeles in charge of oil negotiations, more recently still was president of the Continental Consolidated Corp., and is a widely experienced geologist and petroleum engineer.

Lowell Stanley, one of the founders of the company, and an officer since its organization in 1938, becames chairman of the board in succession to the late C. M. Cotton.

MILTON S. BERINGER has been elected chairman of the board of The British American Oil Co., Ltd. He succeeds William K. Whiteford who resigned to become executive vice president and director of the Gulf Oil Corporation.

Mr. Beringer joined British American 18 years ago. He has been vice president of manufacturing for the past six years and was appointed a director of the company in 1950. He is also a vice president and director of B-A-Shawinigan Ltd., a new petrochemical company formed to manufacture acetone and phenol.

At the same board meeting James Y. Murdoch was elected chairman of the executive committee of the board of British American. Mr. Murdoch has served as a director of B-A for 18 years, and is president of a number of industrial companies, including Noranda Mines Ltd.

M. S. Beringer J. Y. Murdoch

Pyrene
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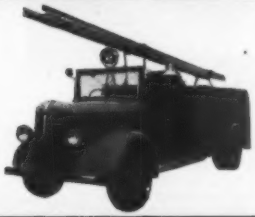

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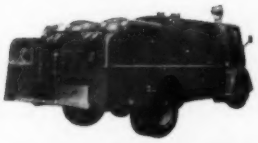

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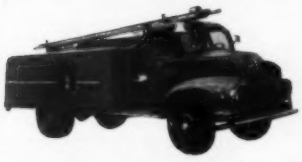

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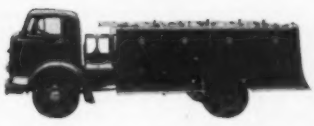

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E. A. Jamison

EDWARD A. JAMISON, a pioneer in the engineering and sales of liquefied petroleum gas, has joined the general sales department of the Gulf Oil Corp., Pittsburgh. Prior to joining Gulf he was with the Phillips Petroleum Co. for 23 years in the LPGas sales and engineering field. He has had wide experience in the sales and application of these products in the industrial and utility fields. Mr. Jamison has engaged in extensive studies and has conducted surveys on the application and use of LPGas as a motorfuel for over-the-road trucks and urban transit line buses. At Gulf he will directly assist L. F. Craig, general sales manager of special products.

DR. WARREN F. FARAGHER, technical advisor to the vice president for research and development of Houdry Process Corp., Philadelphia, has received an award from the U. S. Army for his investigations and contributions to the World War II effort in the field of industrial intelligence. A certificate of appreciation signed by Frank Pace, Jr., Secretary of the Army, was presented to Dr. Faragher, in a special ceremony at Franklin Institute by Col. Edwin M. Sutherland, chief of the Pennsylvania Military District, in recognition of his services as an investigator of the German fuels and lubricants industry near the end of the last war.

H. L. BARNEBEY, formerly sales promotion manager and chlor-alkali department manager for the Blaw-Knox Construction Co., has opened consulting offices in Pittsburgh for the selection, evaluation, and licensing of important chemical and petroleum processes.

CHARLES C. DUNN has been elected vice president in charge of sales of the McColl-Frontenac Oil Co. Ltd. He has been active in various executive capacities in the sales department of The Texas Co. for many years.

C. C. Dunn

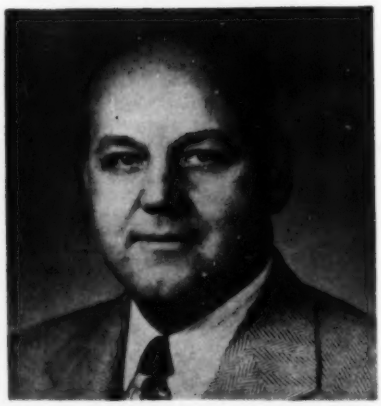
British-American Vice President

J. E. Matter has been named as vice president in charge of exploration for The British-American Oil Producing Co. in Tulsa. He had been serving previously as division exploration manager of the southwestern division with headquarters in Fort Worth, Texas. Mr. Matter is a native of California and was graduated from U.C.L.A. with a degree in geology. He then spent two years studying in Germany at the University of Munich and the Freibuerg School of Mines.

After two years in Shell Oil Company's geological department, he joined British-American as a geologist in the Rocky Mountain area and in California. In 1945 he was made exploration manager for the California division and remained there until January 1950, when he was transferred to Fort Worth to organize the southwestern division of British-American which includes all West Texas and New Mexico.

J. H. FORRESTER of Oklahoma City, Okla., has been appointed manager of research of the Standard Oil Co. (Ind.) to succeed Dr. R. C. Gunness who has been made assistant general manager of manufacturing. Mr. Forrester is currently manager of the central division of Stanolind Oil and Gas Co. He held various positions in the research department of the Standard Oil Co. beginning in 1929, and was associate director of technical service at the time of his 1946 transfer to Stanolind.

BS&B Open Los Angeles Office



Ross Baze

Ross Baze, named west coast sales manager of Black, Sivalls, & Bryson, Inc., will be in charge of the Los Angeles sales office at 1274 La Brea Ave. Bill Lacy will be his assistant. They will handle the complete BS&B line of oilfield products. During World War II, Mr. Baze served in the Persian Gulf Command of the U. S. Army. When discharged he joined Hanlon-Waters as service engineer in Louisiana where he was soon promoted to district manager. After Black, Sivalls & Bryson bought Climax Industries, Baze was appointed sales manager of its Climax Control division.

DAVID GRAHAM of Tacoma, Wash. has been elected financial vice president of Standard Oil Co. (Ind.) He is at present financial vice president of the Weyerhaeuser Timber Co. He will take up his new position in Chicago on Jan. 1, 1952 to succeed the late R. J. Lindquist.

Born in northern Ireland March 11, 1905, Mr. Graham is a graduate of Queens University, Belfast. He entered Massachusetts Institute of Technology in 1927 and later Harvard Business School. After a year with J. P. Morgan & Co. in New York, Mr. Graham spent nine years in London before returning to the United States in 1941. He was naturalized in 1942. He served as director of the office of pulp allocation with the War Production Board to the end of 1944 and was then treasurer of the West Virginia Pulp and Paper Co. until 1948. Since then he has been with Weyerhaeuser.

C. E. Hendricks

C. E. HENDRICKS, formerly a director and vice president in charge of engineering at Century Geophysical Corp. has resigned to form his own service organization for the maintenance of seismograph instruments and as consultant for engineering problems related to seismology. The new firm will be known as the C. E. Hendricks Co. Midwestern Geophysical Laboratory, Tulsa, has retained Mr. Hendricks as consulting geophysical engineer and seismograph equipment sales representative.

H. F. GLAIR, general manager of manufacturing and a director of Standard Oil Co. (Ind.) has been appointed to a new position as director of purchases. Purchasing has not been directly represented on the board since the retirement of E. J. Bullock in 1939. J. F. Hewson, who has been manager of the purchasing department, continues in that capacity under Mr. Glair.

S. A. Montgomery has succeeded Mr. Glair as general manager of manufacturing and been elected a director. Dr. W. J. McGill, who has been superintendent of operations since 1948, becomes assistant general manager. On Jan. 1, 1952, Dr. R. C. Gunness will also be made an assistant general manager of the manufacturing department. Dr. Gunness is now manager of the company's research department. He is on leave serving as vice chairman of the research and development board of the Dept. of Defense in Washington. On return from that duty he will take his new position with the company.

F. M. SIMPSON has been elected president of Cit-Con Oil Corp. at Lake Charles, La. He succeeds Burl S. Watson, who becomes chairman of the executive committee. Mr. Simpson has been vice president and general manager of Cit-Con since its organization in 1947. Jointly owned by Cities Service Co. and Continental Oil Co., Cit-Con is one of the largest lubricating oil plants in the country, with an output in excess of 8,000 barrels daily.

F. M. Simpson

Oil Industry Workers Visit U.S.

Under sponsorship of the Economic Cooperation Administration and in pursuance of its technical assistance program, two parties of European oil men, twenty-nine in number, arrived in New York on October 21 for a six weeks intensive study of American methods and equipment. The party included refinery managers, engineers and makers of equipment. The trip was proposed by the Organization for European Economic Cooperation (OEEC).

After their stay in New York the visitors divided into two groups, one interested in drilling and production and the other studying refining operations. The refining group was guided by C. C. Moore, ECA consultant, formerly with Caltex, and R. A. Keppel of the Petroleum Administration for Defense. The production party was in charge of F. T. Ostrander, formerly with the National Supply Export Corp., and J. J. Brazil of the Petroleum Administration for Defense.

Members of the refining group and the countries they represent are as follows:

Austria: Adolf Winkler, PRAM Oil Exploration Co.

Belgium: Edgard Demierbe, ACEC Co., and George deHenau.

Netherlands: Louis Schoorl, N. V. Nederlandse Raffinaderij van Petroleumproducten; Henricus Conijn, Werf Gusto Ltd.; Eduard Insinger, Royal Dutch Engine Works.

France: Andre Rousselle, Societe Francaise des Regulateurs Universels Arca; Charles Schmid-Laurent, Ets. Bignier Schmid-Laurent; Jean Svoboda, Societe Francaise de Construction Babcock & Wilcox; Arthur-Leon Vinckier, S. A. J. Cocard; Philippe Blachais, Compagnie Generale de Construction Batignolles-Chatillon; Raymond Garde, Ministry of Fuel and Power; Georges Oyer, SAPAG; Albert Saurat, Societe Generale des Huiles de Petrole; Alexandre Mallah, Compagnie Francaise du Raffinage.

Italy: Paolo Casiraghi, Italian affiliate of Caltex Co.; Giorgio Millio, IRCO Oil Refinery; Vincenzo Pessarelli, Industria Raffinazione Oli Minerali.

United Kingdom: Douglas Wilson, United Steel Cos. Ltd.; Frank Kenyon, William Kenyon & Sons Ltd.

Germany: Franz Kohler, Friedrich Uhde K.G.

Members of the production group are:

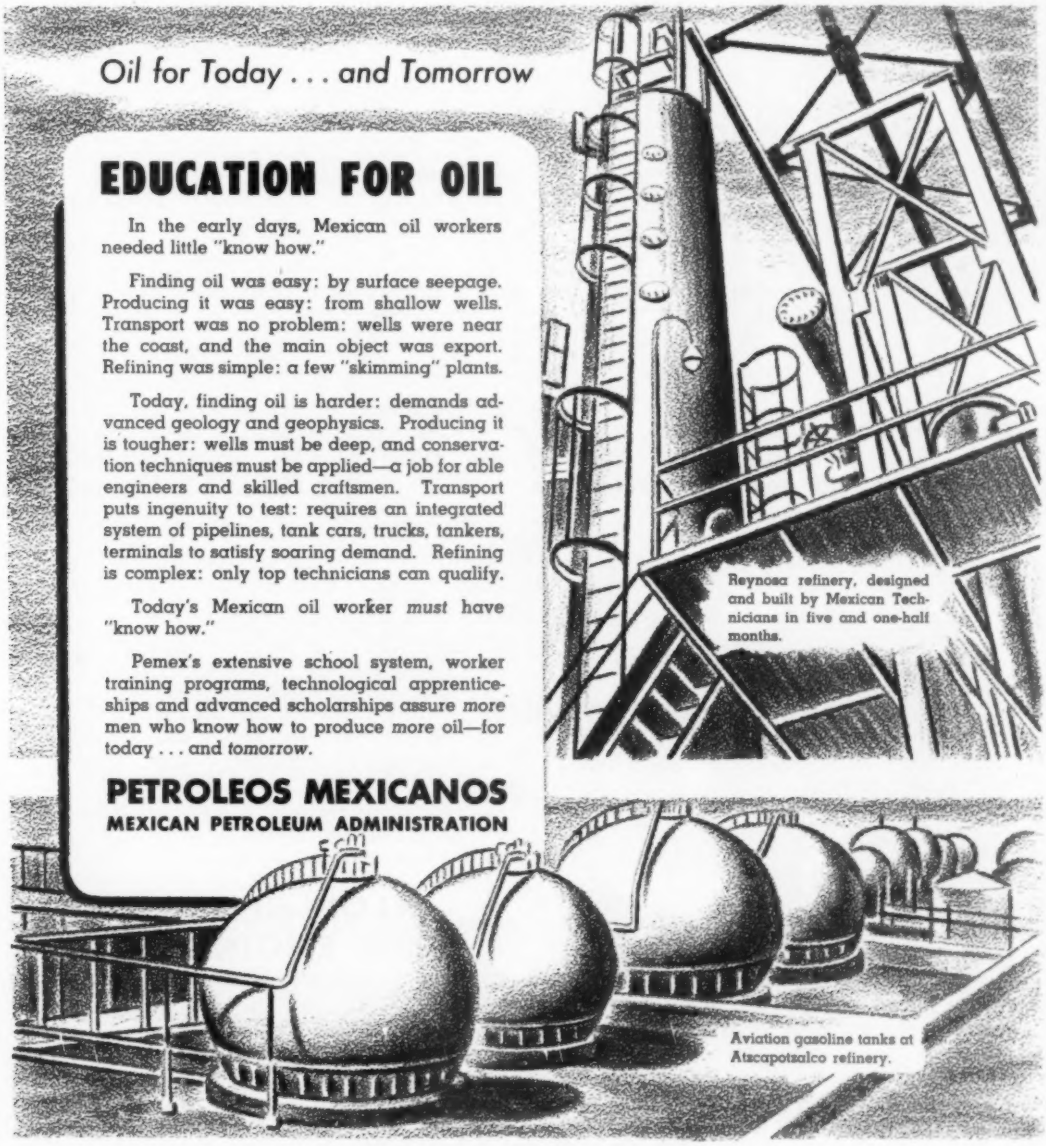
France: Jacques Dommain, Societe de Fabrication de Materiel de Forage; Henry Ballande, Societe National des Petroleos du Languedoc Mediterraneen.

Germany: Hans-Heinrich Haarmann, Deutsche Erdol A. G.

Italy: Mario Fugazza, Milano; Mario Massarenti, Societa Massarenti.

Netherlands: Cornelis de Reus, Werf Conrad and Stork Hijsch N.V.

United Kingdom: Stanley Mackenzie, Oil Well Engineering Co.; James Steel, Ruston & Hornsby, Ltd.


Oil for Today . . . and Tomorrow
EDUCATION FOR OIL
In the early days, Mexican oil workers needed little "know how."
Finding oil was easy: by surface seepage. Producing it was easy: from shallow wells. Transport was no problem: wells were near the coast, and the main object was export. Refining was simple: a few "skimming" plants.
Today, finding oil is harder: demands advanced geology and geophysics. Producing it is tougher: wells must be deep, and conservation techniques must be applied—a job for able engineers and skilled craftsmen. Transport puts ingenuity to test: requires an integrated system of pipelines, tank cars, trucks, tankers, terminals to satisfy soaring demand. Refining is complex: only top technicians can qualify.
Today's Mexican oil worker must have "know how."
Pemex's extensive school system, worker training programs, technological apprenticeships and advanced scholarships assure more men who know how to produce more oil—for today . . . and tomorrow.
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Reynosa refinery, designed and built by Mexican Technicians in five and one-half months.
Aviation gasoline tanks at Atscapotzalco refinery.

Gulf Adds New Directors

At the meeting of Gulf Oil Corporation directors in Houston, Texas, on October 23, the first to be held outside the home offices in Pittsburgh in the fifty years of the company's existence, several additions were made to the executive staff. William K. Whiteford, former president and board chairman of British American Oil Co. Ltd. of Canada, was elected a director and executive vice president. W. L. Naylor, comptroller, and Ralph O. Rhoades, executive assistant to the vice president in charge of production, were made vice presidents.

Mr. Whiteford comes to his present executive post with Gulf after a varied and successful experience extending over more than 25 years. He was born in California, specialized in engineering and geology at Stanford University, and began his connection with the oil industry as a field worker in southern California. After a brief experience there he went to the Barnsdall Oil Co. and was transferred to its Tulsa offices where he became general superintendent and later vice president and general manager of Barnsdall's mid-continent division. In 1934 he was appointed executive vice president of The British-American Oil Co.'s American producing company at Tulsa, and in 1942 he became executive vice president of the parent company and moved to its Toronto headquarters, becoming president the following year. Early this year he was made board chairman of British-American.

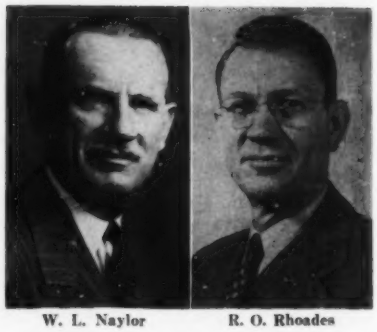
W. K. Whiteford

Mr. Naylor is a veteran of over 30 years service with Gulf, having joined the company's Houston staff in 1920. As vice president he will continue to hold the office of comptroller. In 1923 he went to Tampico, Mexico, as chief accounting and financial officer there. In 1928 he was transferred to the comptroller's staff in Pittsburgh, and in 1934 was elected assistant comptroller of the corporation. In 1948 he became comptroller. He is a director of various Gulf subsidiaries.

Mr. Rhoades has been a member of the Gulf organization since 1926, when he was employed as a geologist and sent to Colombia, South America, on his first assignment. Upon completion of this job, he was sent to the Middle and Far East and spent four years in the Netherlands East Indies.

In 1933 he returned to Pittsburgh and for the next two years was a member of the general office production department geological staff. In 1935 he went abroad to carry out geological investigations in Kuwait, Great Britain, and a number of countries in Europe. He returned to Pittsburgh in 1940 as assistant staff geologist, was appointed chief staff geologist of the production department in 1948 and a year later became chief of the land and exploration division of the production department. On Jan. 1, 1951, he was appointed executive assistant to the vice president in charge of production.

A report to directors by President S. A. Swensrud showed that Gulf's production of crude during the first nine months of 1951 had increased more than 16 percent over the corresponding period of last year. Net earnings, after providing for federal taxes at the higher rate recently enacted, were $93,612,000, equal to $4.13 per share of the capital stock. This compares with an income of $83,200,000, or $3.67, computed on the same number of shares for the first nine months of 1950. Directors authorized a dividend of fifty cents a share for the current quarter, and a year-end special of twenty-five cents, placing the present shares on a $2.00 basis.



W. L. Naylor R. O. Rhoades

Desk and Derrick Clubs

Eleanor Crockett, Royalite Oil Co. Ltd., president of the Calgary, Alberta, Desk and Derrick Club, was honored at a luncheon recently at the University Club by the Los Angeles Desk and Derrick Club. Florence Hopkins, United Geophysical Co., and president of the Los Angeles Club, together with other officers and committee chairmen of the local group were hostesses.

DOUGLAS KELLY, JR. has been named manager of chemical sales in the western division of Lion Oil Co. He has served as assistant sales manager of this division since Feb. 16, 1951.

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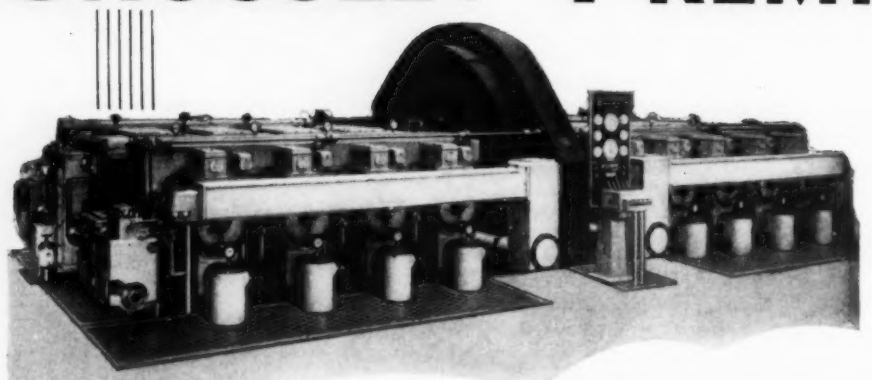

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F. M. Perry R. L. Kidd C. S. Mitchell T. P. Steeper S. Harlan G. Lee L. N. Haugen

Cities Service Executive Appointments

A series of changes in executive duties and responsibilities within the Cities Service Oil Co. of Delaware and its subsidiaries have been announced by W. Alton Jones, president of Cities Service Co., the parent organization. The Delaware company is the largest operating subsidiary of the Cities Service system. It operates throughout the Mid-Continent area as a fully integrated oil company.

Three new vice presidencies and re-alignment of other executive functions under President A. W. Ambrose, chief executive officer, are preliminary to an expanded program. The company is increasing its activity in the field of petro-chemicals. Plans are now being developed for construction of plant facilities to produce plastics, synthetic rubber, additives for lubricating oil, anti-freeze, ammonium nitrate for fertilizer, and many high volume petro-chemicals.

Newly elected vice presidents are Lee N. Haugen, manager of the refining division; Frank M. Perry, manager of the gasoline-chemical division; and Gentry Lee, general counsel.

Direction of the oil production and the land and geological divisions will be vested in Vice President Robert L. Kidd, with Ray Althouse as assistant. Mr. Kidd also becomes president of Cities Production Corp., a wholly owned subsidiary of Cities Service Oil Co. which owns gasoline plants and some 10,000 barrels per day of crude production.

C. S. Mitchell was elected president of Cities Service Pipe Line Co., which handles crude oil and products pipe line operations.

Vice President Sam Harlan was elected president of American Gas Production Corp., another wholly owned subsidiary, which produces about 250 million cubic feet of gas per day.

Vice President T. P. Steeper was elected president of Terminals Facilities, Inc., which owns compounding facilities and some 900 tank cars.

Named to the operating committee were Messrs. Harlan, Haugen, Kidd, Lloyd Lynd, F. B. Plank, E. L. Stauffacher, Steeper and Lee.

Reopen Sinclair Negotiations

Negotiations between the Sinclair Oil Corp. and Petroleos Mexicanos about the possibility of a major wildcat drilling program in the south of Mexico have been reopened. Sinclair negotiators are H. L. Phillips, president of the Sinclair Oil & Gas Co., and H. A. Hassan, vice president of the Sinclair Refining Co.

To Build Research Laboratory

Filtrol Corp. will build a 16,000-square-foot building to house its expanding research activities. The new research building will be located adjacent to Filtrol's Vernon, Calif., manufacturing facilities. Completion is expected before the middle of 1952. Filtrol built a new $3 million catalyst plant in Salt Lake City early in 1951. Several other projects are now under investigation.

Jersey Combines Six Caribbean Affiliates

To meet the administrative requirements in the Caribbean area resulting from rapidly growing demand for petroleum products, Standard Oil Co. (N.J.) has reorganized the operations of six wholly-owned affiliates into one company with headquarters at Havana. Esso Standard Oil (Central America) S.A. will change its name to Esso Standard Oil S.A., and will acquire the business and assets of these five affiliates: Esso Standard Oil (Antilles) S.A.; Esso Standard Oil (Caribbean) S.A.; Esso Standard Oil Co. (Cuba); Esso Standard Oil Co. (Puerto Rico); and Standard Oil (Canal Zone) Co.

President of the new company will be Fred H. Billups, now Western Hemisphere marketing advisor for Jersey Standard. Henry P. Blackeby, assistant comptroller of Jersey Standard, will be chairman.

H. P. Blackeby F. H. Billups

Besides its international office at Havana, Esso Standard Oil S.A. will continue principal offices in Cuba, Panama, Dominican Republic, Puerto Rico, and Trinidad, and the present offices in other countries in which Esso operates. Operating responsibilities will be largely decentralized to these offices.

Fawley Refinery Communications

The comprehensive system of automatic telephones installed at Fawley by the Automatic Telephone and Electric Co. amply covers the internal communication requirements of the refinery. The 600-line installation allows for general service and also for those emergency services required in case of fire or accident. Owing to its importance in an industry of this kind, the fire service, in case of necessity, can be given first priority over all other services from the office of the fire control officer, while accident calls can be given a second priority.

Largest Crude Still

Foster-Wheeler Corp. has been awarded a contract from Gulf Oil Corp. for the design, engineering, fabrication, and erection of a 125,000-barrel atmospheric and vacuum unit to be installed at Gulf's Philadelphia refinery. This unit, when completed in the summer of 1953, will be the largest single crude distillation unit ever constructed.

Expect 4 to 5 Percent Increase in Demand

A four to five percent rise in demand for petroleum products next year was forecast by Cecil L. Burrill, director of the program division of the Petroleum Administration for Defense, at the recent annual meeting of the American Petroleum Institute in Chicago. United States domestic demand was placed at 7,775,000 b/d compared with 7,445,000 b/d in 1951 and 6,803,000 b/d in 1949. The overall impact of the supply-demand conditions, he said, "indicates a relatively easy supply situation throughout the year 1952." Mr. Burrill, who is serving government without compensation, is a director of the Creole Petroleum Corp.

Synthetic Phenol Plant Planned

Plans for construction of the first synthetic phenol plant in the west have been announced by Standard Oil Co. of Calif. The new plant, to be built at the company's Richmond refinery, will cost approximately $4 million. It will utilize a recently-developed synthesis process in which neither sulfuric acid nor chlorine is used.

New Furfural Plant Open

Operation of the new furfural plant at Omaha, Neb. has begun, according to Dr. Homer R. Duffey, general manager of the chemicals department of The Quaker Oats Co. This plant is designed to use corn cobs and other agricultural residues as raw materials. It will make available substantially increased quantities of furfural for petroleum refiners in processing of lube stocks, gas, oil and catalytic cracker recycle stock.

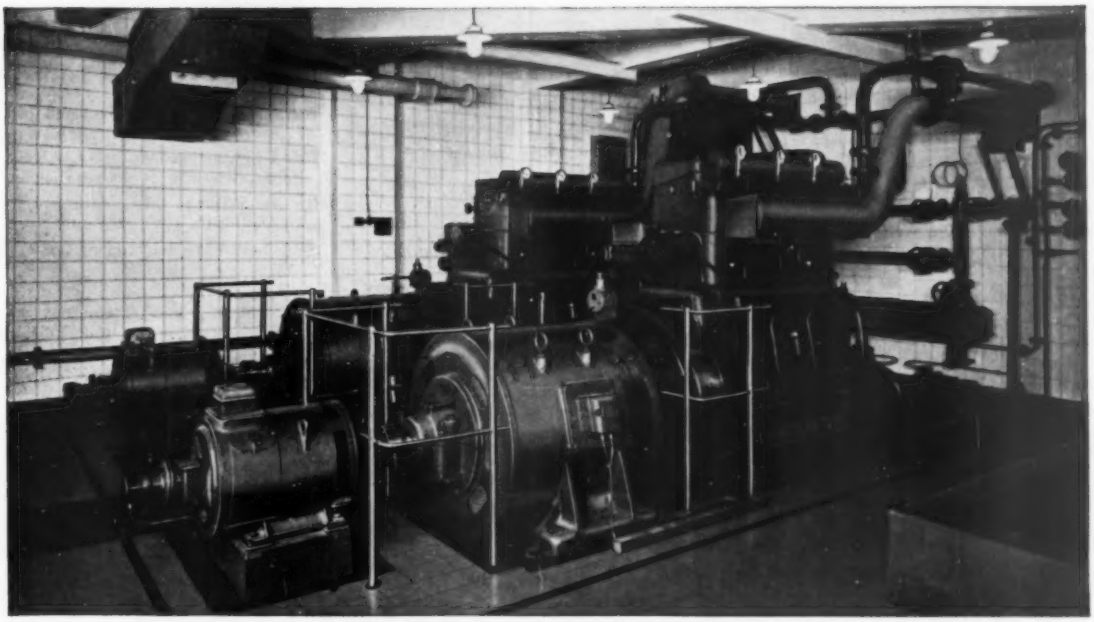
With the benefit of increased capacity, Quaker expects to supply in the immediate future initial charges for two new French lube oil plants now virtually completed as well as initial fill and makeup for enlarged facilities of several United States plants. Provision has also been made for furfural supplies for other petroleum processing plants in various stages of construction.

Furfural is also under active consideration in the extraction of benzene and other cyclic hydrocarbons, and will probably be used either in extractive distillation or in liquid-liquid extraction of this type of aromatics.

In addition to its use in refining, furfural is also used in extracted distillation of butadiene and other C_4 hydrocarbons, the manufacture of synthetic resins, decolorizing wood rosin and as a chemical intermediate in the manufacture of furfuryl alcohol, tetrahydrofurfuryl alcohol and hexamethylene-diamine. The diamine is used extensively in the manufacture of nylon.

'ENGLISH ELECTRIC'

diesel engines



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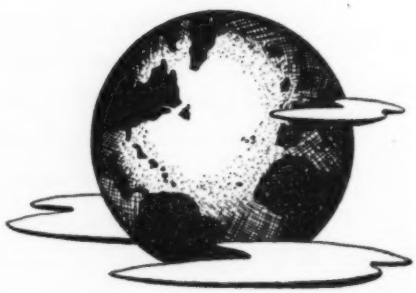

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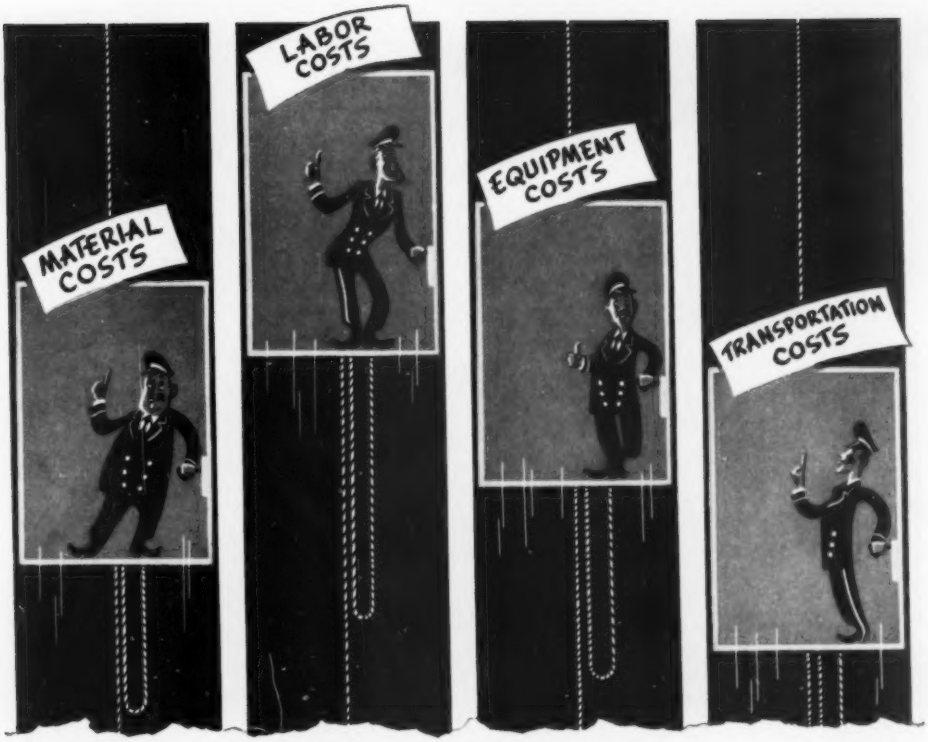

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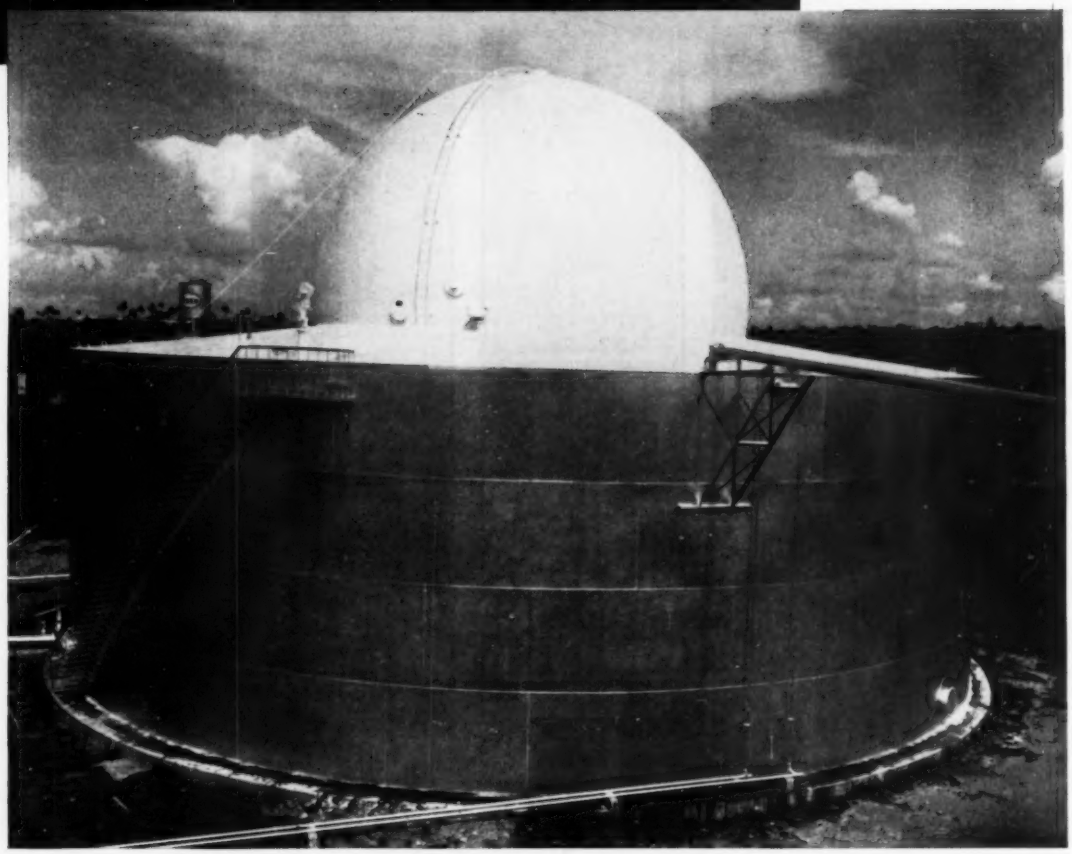
Duncan, Oklahoma

REDUCE STANDING STORAGE EVAPORATION LOSSES



with a *HORTONDOME ROOF*

The Hortondome Roof is one of the thriftiest vapor saving devices used in the petroleum industry. A typical installation is shown above at the Esso Standard Oil Company (Cuba) Belot refinery near Havana.

The Hortondome Roof is used primarily to reduce standing storage evaporation losses by serving a single tank or being the central unit of a vapor saving system consisting of several interconnected tanks.

Here's how the Hortondome Roof operates

There is a flexible, hemispherical membrane inside the Hortondome. The edge of this membrane is fastened to the Hortondome at its equator. When the atmospheric temperature rises, expanding vapors lift the membrane into the dome to provide the additional capacity needed. Vapor can not escape as long as the amount of expansion that takes place does not exceed the capacity of the Hortondome Roof.

For more complete information, write our nearest office. There is no obligation on your part.

Above: Diagram illustrating how the vapor spaces of two cone roof tanks are connected to the vapor space of a Hortondome Roof tank. The flexible membrane is shown almost full of vapor.

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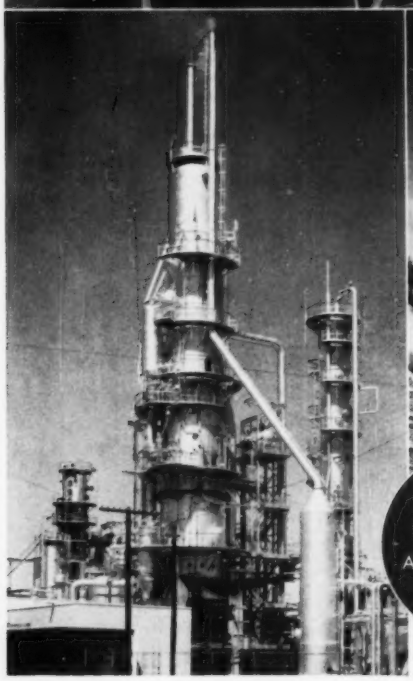
from Tarring Terry and all the Johnston gang

PORTRAITS of PROGRESS
in INDUSTRY TODAY



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